

BUILDING CONTRACTS
THE PRINCIPLES AND PRACTICE OF
THEIR ADMINISTRATION

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PRACTICAL GEOMETRY FOR BUILDERS AND ARCHITECTS

By J. E. PAYNTER

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BUILDING CONTRACTS

THE PRINCIPLES AND PRACTICE OF
THEIR ADMINISTRATION

BY

EDWIN J. EVANS

FOREWORD

BY

SIR CHARLES T. RUTHEN, O.B.E., F.R.I.B.A.

H.M. DIRECTOR-GENERAL OF HOUSING

AND

PRESIDENT OF THE SOCIETY OF ARCHITECTS

178108.
16.2.23.

LONDON

CHAPMAN & HALL, LTD.

11 HENRIETTA STREET, W.C. 2

1922



Printed in Great Britain at
The Mayflower Press, Plymouth.
William Brendon & Son, Ltd.

EDITORIAL NOTE

THE DIRECTLY-USEFUL TECHNICAL SERIES requires a few words by way of introduction. Technical books of the past have arranged themselves largely under two sections: the Theoretical and the Practical. Theoretical books have been written more for the training of college students than for the supply of information to men in practice, and have been greatly filled with descriptions of an academic character. Practical books have often sought the other extreme, omitting the scientific basis upon which all good practice is built, whether discernible or not. The present series is intended to occupy a midway position. The information, the investigations, and the discussions are to be of a directly-useful character, but must at the same time be wedded to that proper amount of scientific explanation which alone will satisfy the enquiring mind. We shall thus appeal to all technical people throughout the land, either students or those in actual practice.

FOREWORD

By SIR CHARLES T. RUTHEN, O.B.E., F.R.I.B.A.

H.M. Director-General of Housing
and President of the Society of Architects

ANY work designed for the education of those actually engaged in, or intending to enter upon, any branch of the building industry of necessity should be welcomed by all having the slightest knowledge of the vital importance of this great craft ; to the social and industrial well-being of the nation.

An industry of ancient origin, and in pre-war days the third largest in the British Isles, its enormous importance to the State, the ramifications of its operations, and the complex character of its machinery, were seldom, if ever, fully grasped by even a very small proportion of the millions who unconsciously availed themselves of the products of its labour.

Perhaps the suspension of the energies of this great national machine, when the outbreak of the Great War called for every effort to be thrown into the gigantic struggle against the common enemy of civilisation, produced for the first time in our generation some slight appreciation of the vast services rendered by the teeming ranks of this important industry. It was not, however, until after the cessation of hostilities, when the ranks of the industry had suffered seriously, directly and indirectly, from the effects of the world struggle, that the full effect of the absence of a strong and virile building industry was fully felt.

One only of the departments of this industry is the production of homes for the people of this country, and all those with knowledge appreciate only too well that the troubles in this direction are legion. Since the days of primitive man,

whose dwelling was a cave, dark and insanitary, housing has always been a problem charged with many difficulties. This problem, as understood in the twentieth century, is mainly the product of the revolution of industry and the crowding of the ever-increasing population into comparatively confined and limited areas.

It cannot be said that the requirements of any age in the matter of housing have been at any time comprehensively or satisfactorily met ; in fact, the problem is developing more rapidly than criticism or action. The former has been ever far in advance of the latter.

Accentuated gravely by the suspension of building activities for practically five years, the problem has been rendered more serious by the lack of education and application of those who form the ranks of this building industry.

There are, in addition, the homes of commerce and industry, so sadly needed at the present time if our country must keep ahead in the race of civilisation.

The building industry is one of great complexity, and it is necessary that all its parts shall be well balanced and well calculated if the whole is to run smoothly and satisfactorily.

The work produced by Mr. Edwin J. Evans, after much labour and research and commendable patience, has for its object the education of all those engaged in the preparation and administration of contracts for building work. Those who have been engaged, as has the writer of this Foreword, for very many years in the control of building works will readily agree that most of the troubles which constantly arise during the progress of works are directly or indirectly attributable to inexperience or carelessness in the preparation or administration of contracts.

To all those who propose to exercise the art or practise the business of building, let it be understood that education is of vital necessity ; not only the proper training and education of the Architect, but of the manufacturer, of the operative

and estimator, supervisor and administrator, if this vital industry is to regain its pre-war activity and importance.

It is a mistake to think that anyone can become a master builder ; that anyone can estimate for the carrying out of a piece of building work ; or that anyone can superintend the execution of building work or satisfactorily control the organisation necessary for successful contracting. It is as simple to think that anyone without training and education can become an Architect.

The building industry is composed of five great arms—the Building Owner, the Architect, the Manufacturer, the Building Contractor, and the Operative, and all good contracts should provide that the true interests of these sections are protected, and that in administration a correlation is effected to the harmonious and satisfactory completion of the contract.

Mr. Edwin J. Evans' effort is sent forth with the sincere hope that it may assist in the process of education, and that as a result more careful consideration will be given to the preliminary negotiations and arrangements, and many of the pitfalls so characteristic in building contracting will be avoided.

The building industry has a great field of labour in front of it. Business methods are required more to-day than at any time in the history of the world, and with their proper incorporation into the labours of this craft, the honoured place held for centuries will be again attained.

MINISTRY OF HEALTH, WHITEHALL, S.W. 1.

20th December, 1921.

AUTHOR'S PREFACE

THE Building Trade has been very liberally supplied with books dealing with its "Technical" or "Constructional" side, but the "Business" or "Administrative" section appears to have been practically neglected. This book is an attempt to satisfy the need in that direction, as well as an endeavour to promote a certain amount of uniformity in Contractors' methods and practice.

It is hoped that it will be found useful to all who are interested, or take an active part in the administration of a Building Contractor's Business, including experienced Contractors as well as Managers, Clerks of Works, Foremen, Tradesmen, and Students, all of whom, no doubt, will find here something of interest and service to them.

For the sake of general convenience and utility, the book has been divided into four parts, viz.—

1. Administration of Contracts.
2. Office Management and General Notes.
3. Book-keeping, etc.
4. Trade Memoranda and Plant Lists.

An endeavour has been made to present the subject in as lucid and practical a manner as possible, and it is hoped that the writer's efforts will meet with appreciation.

I take this opportunity of expressing my great pleasure in having obtained a "Foreword" from so eminent an authority as Sir Charles Ruthen.

I also gratefully acknowledge the assistance which I have received from some of my friends who have read the proofs and helped me with kindly criticism and advice.

EDWIN J. EVANS.

December, 1921.

CONTENTS

PART I

ADMINISTRATION OF CONTRACTS

CHAPTER		PAGE
	INTRODUCTION	xiii
I.	METHODS USUALLY ADOPTED BY CONTRACTORS TO OBTAIN BUSINESS	3
II.	ESTIMATING AND LABOUR PROBLEMS	8
III.	ADMINISTRATION OF CONTRACTS	17
IV.	THE ARCHITECT	24
V.	THE GENERAL FOREMAN	27
VI.	PRELIMINARIES TO BUILDING OPERATIONS	35
VII.	EXCAVATOR	42
VIII.	CONCRETOR	44
IX.	DRAINER	46
X.	BRICKLAYER	47
XI.	MASON	50
XII.	CARPENTER	54
XIII.	JOINER	58
XIV.	IRONMONGER	66
XV.	SLATER AND ROOF TILER	71
XVI.	FLOOR AND WALL TILER	74
XVII.	IRONFOUNDER AND SMITH	76
XVIII.	PLASTERER	81
XIX.	PLUMBER AND GASFITTER—ELECTRIC LIGHTING AND HEATING	83
XX.	PAINTER	88
XXI.	GLAZIER AND PAPERHANGER	91
XXII.	SUNDRY ITEMS AT COMPLETION STAGE OF CONTRACT AND DAMAGES ON CONTRACTS	95

PART II

OFFICE MANAGEMENT AND GENERAL NOTES

CHAPTER	PAGE
XXIII. OFFICIAL ADMINISTRATION	103
XXIV. CORRESPONDENCE	108
XXV. LETTERS, QUOTATIONS, AND RECEIPTS	111
XXVI. OFFICE DIARY	113
XXVII. TRADE EXPENSES—ESTABLISHMENT OR OVER- HEAD CHARGES	116
XXVIII. BANKING AND BANK CHARGES.	119
XXIX. PRICE BOOKS	124
XXX. PURCHASING AND KEEPING STOCK	127
XXXI. ORDERS: HOW TO ISSUE THEM, ETC.	133
XXXII. SUBCONTRACTING	146
XXXIII. CEREMONIES	149
XXXIV. DEMOLITION OF BUILDINGS	150
XXXV. HAULAGE OR TRANSPORT	151
XXXVI. MACHINERY AND PLANT	154
XXXVII. ARCHITECTS' CERTIFICATES	157
XXXVIII. CONTRACTORS' ACCOUNTS, INVOICES, AND PAY- MENT OF ACCOUNTS	163
XXXIX. DAYWORK	166
XL. INSURANCE	167
XLI. WATER FOR CONTRACTS	178
XLII. RATES AND TAXES	179
XLIII. RAILWAY RATES AND CHARGES	185
XLIV. "EMPTIES" AND SACKS	194
XLV. RETURN OF GOODS AND MATERIAL	196
XLVI. BREAKAGES AND SHORTAGES	197
XLVII. PAYMENT OF WAGES	199
XLVIII. STOCKTAKING	200
XLIX. CATALOGUES	202

PART III

BOOK-KEEPING, ETC.

CHAPTER		PAGE
L.	BOOK-KEEPING	209
LI.	PRIME COST	223
LII.	WAGES BOOK	230
LIII.	MACHINERY	236
LIV.	INVOICES	238
LV.	GENERAL STORES BOOK	249
LVI.	TIMBER BOOK OR SHOP FOREMAN'S TALLY BOOK	251
LVII.	HAULAGE OR TRANSPORT BOOK	254
LVIII.	PETTY CASH	257
LIX.	CASH BOOK	258
LX.	TRANSFER BOOK	259
LXI.	JOINERY COST BOOK	262
LXII.	CONTRACT ACCOUNT BOOK	264
LXIII.	ORDER BOOK	266
LXIV.	DELIVERY BOOK	268
LXV.	PLANT BOOK	270
LXVI.	EMPTYES BOOK	272
LXVII.	RETURNS ADVICE BOOK	274
LXVIII.	COPYING AND ADDRESS BOOKS	275

PART IV

TRADE MEMORANDA AND PLANT LISTS.

LXIX.	MEMORANDA FOR CONTRACTORS	279
LXX.	PLANT LISTS	293
	INDEX	298

INTRODUCTION

A FEW years ago all classes of trade (including the Building section) were carried on in so lax a manner that one of our most prominent commercial men was constrained to remark :

“ That England was going along, with one or two remarkable exceptions, in a very easy way, taking in most cases the line of least resistance. We were sitting quiescent while the foreigner acquired and developed the resources of our Empire, the result being that, as a nation, we were fast drifting to a very secondary position in the ‘ World of Commerce.’ ”

The recent war, however, has been instrumental in waking up our nation to the truth of the situation as portrayed above, and it is hoped that this book will in some measure help those engaged in the Contracting business to realise their opportunities and to equip and fit themselves in the best possible manner for the coming great business revival in the building trade.

In introducing our subject it may be justly claimed that the business of Building Contracting is one of the most interesting that it is possible for any energetic, intelligent man to be engaged in. The possibilities offered are almost unlimited and the prospect of a successful career immense, but, like every other business, it involves serious problems of administration. The business, it may be pointed out, is a “ Combination of Trades,” each of which cannot fail to create an endless variety of interest and scope for energy. The student will find that it will not only be necessary that he should study each of these trades, but that he will also have to thoroughly master their essential points in order to be able to deal satisfactorily

with the various problems that invariably present themselves from time to time. If he desires to qualify for a controlling position, he will find that, although serious responsibilities will be placed upon him, such responsibilities bring compensation and pleasure owing to their varied interest and character, a phase of the subject which must not be lost sight of. To the energetic junior the question often occurs "Why" and "How" certain operations are performed. This book is a modest attempt to answer in some degree a few of these natural enquiries.

Another of its objects is to counteract the somewhat harmful tendency of those educational authorities who omit in their curriculum a study of a practical "Business Methods" course for their Building Trade students, which the writer believes would be of far more real value than some of the studies which are now included. Considering the importance of the subject, it is almost incredible that the "business" phase has been so sadly neglected.

The following chapters will therefore be devoted to the consideration of those matters which chiefly affect the administration and maintenance of a Contractor's business. Pointers will be given as to the best means and methods of mobilising and properly organising all available forces for the ultimate success of any work undertaken, both from a financial as well as from a constructional standpoint. To the subject of Contracting we could legitimately add many points of interest, such as—

The History of Contracting.

The Raising or Production of necessary Capital for Contracting.

The Legal aspect and various Acts relating to Contracting, etc.

But as these appear to require special and rather protracted treatment, and do not of necessity have any direct bearing on the main purpose of our book, we have refrained from introducing them.

At the outset the reader should be warned that the four cardinal errors to guard against in business are—

INERTIA,
DISORGANISATION,
PROCRASTINATION, and
WASTE.

These errors, or vices, hardly need any comment, since their effect must be quite apparent to the ordinary reader. Nevertheless, he is asked to ponder over them not a little, and endeavour to appreciate to the fullest extent the effect they will have if any indulgence in them is permitted.

Possessing a sound commercial education, our Contractor or student should aim at “efficiency” in everything undertaken by him. “Efficiency” has been described as “the best, easiest, and quickest way to obtain a desired object.” Keeping this well in mind, the student is recommended to foster and practice the principal characteristics which make for efficiency, namely—

Earnestness, determination, and ambition.
Imagination, application, and despatch.
Foresight, courage, and self-reliance.
Accuracy and clearness in issuing instructions.
Power and willingness to take advantage of opportunities.
Courtesy, tactfulness, firmness, and reservation.

Successful men in all branches of life have, in a greater or lesser degree, a combination of some, or most, of the above qualities of character. These attainments are, as it were, the concrete base upon which the superstructures of their businesses or professions are reared.

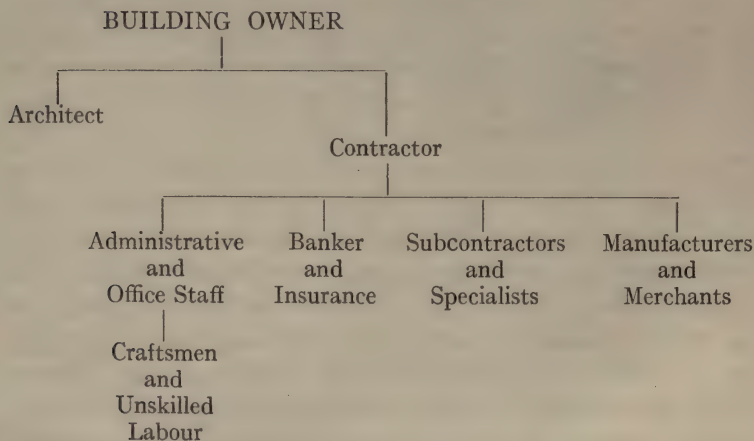
There has been for several years a general movement on foot to raise the standard of efficiency of both tradesmen and officials in connection with most branches of industry by the creation of Art Classes, Technical and Private Colleges, and other similar institutions. These educational agencies have

of business, and may take the form of plant, machinery, buildings, equipment, or actual cash. It is, however, unnecessary for us to amplify the subject in this chapter.

Some contractors succeed when beset with disadvantages and difficulties which appear almost insurmountable, whilst others fail when, apparently, they have everything in their favour for the achievement of success. Again, there are a great number of moderately successful firms who could vastly increase their profits, and certainly put their businesses on a safer and firmer footing, were they to infuse and blend into their administration more of the recognised business practices and principles, especially in regard to machinery, equipment, and organisation, the neglect of which is often accountable for more diminution of profits than they can possibly imagine.

Malpractices of any kind should be suppressed, and "rule of thumb" methods be scrapped, since neither are conducive to real success.

Chief Contributing forces to a Building Contract



PART I
ADMINISTRATION OF CONTRACTS

BUILDING CONTRACTS

CHAPTER I

METHODS USUALLY ADOPTED BY CONTRACTORS TO OBTAIN BUSINESS

THIS subject is a very intricate and extensive one, having really no limitations, and therefore it cannot be satisfactorily dealt with in the confines of this small volume. It will, on that account, be treated simply as a preliminary to our general theme of business management.

To practically adapt one's knowledge and energy to prevailing local conditions and circumstances is one of the secrets of success. The policy pursued by many contracting firms is to make legitimate use of all social and commercial influence at their disposal for the furtherance of their businesses, whilst other firms favour the alternative method of securing their work by tendering for "publicly" advertised contracts, etc. There are numerous large and extensive firms doing work on the first-mentioned method who seldom figure in a public list of tenders. As a rule they bear a reputation for good, sound, reliable work and often have, as a consequence, an exclusive clientele amongst leading architects in the large towns and busy centres. Their work is generally very remunerative and mostly executed for firms of sound financial standing. The work is generally carried out on a percentage on prime cost basis.

The reader should be careful to note that the term "Prime Cost" mentioned here does not mean simply the amount actually expended on wages and material on any one contract, but also includes all "overhead" or "establishment charges" connected therewith, such as :—

Interest on the business capital.

General management and supervision.

Office salaries.

Rent, rates, and taxes.

Interest and bank charges.

Insurance, advertising, and any legal fees.

Stationery, postage, and telephone charges.

Trade subscriptions, donations to charitable and benevolent institutions.

Light, heat, and water.

Upkeep, maintenance, and depreciation of general stocks, buildings, machinery, plant, motors, horses and carts, etc.

Tools and other equipment purchased.

Lost, damaged, and waste material, etc.

Treating trade expenses from a general business standpoint, it may be mentioned that it varies largely according to whether a business is wholesale or retail, industrial or residential, town or country, and credit or cash. For this item of trade expenses $7\frac{1}{2}$ per cent to 15 per cent is generally considered a fair percentage to debit. So that, after adding for profit, the Contractor is paid from 15 per cent to 20 per cent (or even more) over and above the actual cost of wages and material.

In order to make the foregoing perfectly clear we will give our reader a practical illustration.

Let us assume that £4000 has been expended in wages, material, etc., on work undertaken on a percentage basis. The charge for the work should amount to £4840 when arrived at in the following manner :—

	£	s.	d.
Wages, material, etc.	4000	0	0
Say, 10% for trade expenses	400	0	0
	<hr/>		
	4400	0	0
10% agreed profit	440	0	0
	<hr/>		
	4840	0	0

It is surprising how many commissions of this character are secured by some contractors, and often fairly well proceeded with, before their competitors are aware that the work is in operation. It must therefore be obvious that a good portion of the time and energy of these enterprising contractors is spent by keeping in touch with and studying the wishes and

the requirements of architects and others who have work to place. These contractors are usually most obliging and amiable gentlemen who see no trouble in doing anything that will bring about "business." Their deferential attention often leads to a long run of profitable work, and they leave no stone unturned to obtain early "private" information regarding all local and other schemes and projects that are being launched.

Travellers representing builders' merchants, sanitary specialists, heating and ventilating engineers, floor and roof specialists, etc., often supply ("voluntarily") early information of projects that are under consideration, their services being frequently requisitioned by architects to provide approximate estimates and suggestive schemes in relation to prospective work which they have in hand.

There are several other sources of a more permanent and often non-competitive character, from which one can secure work, viz. :—

H.M.O.W.

War Office.

H.M. Prisons.

Admiralty.

Air Force.

Breweries and licensed house proprietors.

Estate agents and managers.

Fire Insurance offices.

Municipal and County Council buildings.

Asylum Boards.

Collieries, etc.

On the other hand, contractors who favour competitive work have a much wider field for operations. Their work although keen, is intensely interesting and the possibilities immense. The variety of work that can be taken up is almost unlimited, and, as a rule, a contractor in this class usually tenders for anything suitable that comes his way.

There are some, however, who specialise in two or three particular kinds of work, such as enumerated below :—

Banks.

Barracks.

Breweries.

Bridges.

Churches.

Factories.

Garages.

Galleries.

Hospitals.

Hotels and restaurants.

efficient, energetic, and contented staff of workmen, they must, by all legitimate means, endeavour to have at all times plenty of work in hand, and this is not always possible where absolute reliance is placed on contract work only.

A workman works with far better spirit, and his production is greater, when he realises that his job is likely to last a considerable time than if the prospects are otherwise. Again, for the same reason of keeping a regular staff of workmen constantly employed during slack periods, some contractors resort to the erection of buildings (on their own account), such as dwelling-houses, villas, bank premises, etc.

This kind of work is usually known as "speculating business." Some leading contractors, with the "pioneer" instinct, often secure sites where leases of old buildings are about to expire and erect thereon buildings which they know from experience are in demand and suitable to the needs of the locality. They also manage and develop property in other ways. When these ventures are wisely considered, and dealt with in a business-like manner, they turn out most profitable undertakings and a source of good revenue for their promoters.

The few foregoing facts are mentioned in order to give the reader some idea of the methods of keeping business at a steady level.

CHAPTER II

ESTIMATING AND LABOUR PROBLEMS

"FIRST catch your hare" should be our motto, and, that being so, it is obvious that before dealing with the subject of "Administration of Contracts," we should first consider the principal method by which contracts are obtained, i.e. "Estimating." There are already many useful books written on the subject of estimating, so that we will simply content ourselves with a few general remarks thereon. One of the first and most important qualifications necessary to attain and maintain a leading position amongst Contractors is that of good, sound, reliable estimating. This fact is not always fully appreciated, and the science of estimating must be thoroughly understood and mastered before a firm can expect to make any real genuine progress in the trade. In order to reach that proficient stage a Contractor has to devote a great deal of time, labour, and thought to the subject. He will, no doubt, acquire the habit of tabulating, from time to time, the cost of the various operations performed by the several trades under his supervision. Many firms employ a staff of able and experienced estimating clerks who devote the greater portion of their time to this section of the business.

The chief factors that count in estimating are : Experience, foresight, and sound common sense. An effort should always be made to arrive, as nearly as possible, at the rock-bottom cost of the several items in a bill before adding for profit thereon. Such cost to include all labour, materials, and overhead charges. It should be the endeavour of Contractors to obtain work that can be commenced approximately in the spring of the year, so that it can be pushed forward and put under cover, if possible, before the wet and really unsettled weather sets in.

When a decision has been made to compete for any particular work, a copy of the advertisement (or full particulars relating to it) should be inserted in a small memorandum book or register set aside for the purpose. Afterwards a set of the quantities (or specification if quantities are not provided)

should be obtained from the Architect. After inspecting the plans, specification, and contract form at the Architect's office, a visit to the site of the proposed building should be made at the first opportunity, when the drawbacks, as well as possibilities of same should be fully considered.

Should any doubtful points arise in the estimator's mind as a result of this visit, another call should be paid to the Architect's office to clear them up before proceeding with the pricing of the Bills of Quantities.

If the administration of the contract involves railway travelling, maintenance, or out-of-town expenses, etc., for the Contractor, his staff, foreman, or workmen, provision should be made for same in the tender.

When at the "site" the best means of ingress and egress should be duly considered, as well as the most suitable and economic manner of handling material. The most convenient position for the placing of the mortar mill, engine, crusher, cranes, putty bays, concrete platforms, etc., and also the best spot on the ground for stacking materials should be thought out.

The road approach may be a bad one, and as a consequence it may be found necessary to make an allowance to provide sleepers for a temporary cartway, etc. The available supply of local labour and the local rates of wages should be ascertained; also whether there is likely to be any advance or reduction in them.

The possibility of obtaining building material in the neighbourhood should also be learned, and whether prices are on a rising or falling market.

Any possibility of risk to adjoining property should be noted. The approximate cost of haulage of materials, etc., from the station, etc., to the site should be ascertained. A quotation from a few of the local haulage or transport contractors is generally found to be a safe guide in this respect. Examine the nature of the soil, ascertain if it is hard, stony, rocky, or in any other way difficult to excavate. Learn if the site is near a river, canal, culvert, or docks from which likely risks of water and other trouble in the foundations, etc., may have to be encountered and provided for. Ascertain if there is a quarry near the site from which walling stone, spalls, etc., can be obtained.

A Contractor can often find a local quarry which may be

worked by him with advantage. A royalty of about 3d. to 6d. per yard cube of stone worked is usually paid for this privilege. Permission for working a quarry has generally to be obtained from the owner or agent of the estate on which it is situated.

Sometimes a large proportion of broken stone and gravel for the concrete foundations can be obtained from these quarries.

If mortar has to be made on the site, the problem of obtaining ashes close to it is not always an easy one, and it is therefore advisable to find out something reliable on that score. Ashes can usually be obtained from railway-engine sheds, breweries, works, factories, or other places where steam boilers are in use, 6d. to 1s. per load being the usual price charged. Sometimes ashes can be obtained gratis.

If the surplus excavation cannot be deposited on the site, a spot should be found as near as possible to same in order to reduce the cost of haulage to the very lowest point. An arrangement can often be fixed up for the deposit of soil in a suitable place upon the payment of a very normal sum. Any arrangement of this nature that may be made, should, if possible, be confirmed by letter before signing a contract for the work, otherwise it is not wise to count on it.

Local haulage contractors are sometimes prepared to find a tip for the excavation and do the haulage at a fixed price per load or yard cube. People are often glad to get excavated soil for filling up purposes.

When the work tendered for is located in a small town or village it is well to ascertain the proximity of railroad sidings, and also what the local railway goods station facilities are for dealing with the unloading of heavy plant, such as engines, mortar mills, etc. It often happens that small stations are unable to cope with this class of traffic, and that special arrangements have to be made to meet the demand. For example, if there is no suitable crane at the depot a requisition has to be made for a travelling crane from another station. This, of course, means extra expense for which the Contractor must make allowance in making up his tender. Again, it may be necessary to make a special application (and pay extra charges in consequence) for obtaining suitable trucks, check trucks, timber sets, covered vans, etc., for loading up timber, scaffold poles, planks, and other plant at these out-of-the-way stations.

Whilst on the subject of country stations, it may be interesting to point out that should the Contractor not be conversant with the district and its general capacity for supplying building materials, he may with advantage pay a visit to the local goods depot, where he would (in all probability) gather most useful and reliable information, as usually a good percentage of building material such as bricks, stone, cement, lime, etc., passes through the railway company's hands.

The source of water supply for building purposes should also be ascertained as well as the probable cost of same. This item is often a costly one. On pages 38 and 178 will be found short articles dealing with this subject. Local authorities, with very limited service, sometimes have quite an aversion to supplying water to Contractors for building purposes, and only do so at an extortionate price. Water can often be obtained gratis from local streams.

If there are any old buildings to be pulled down an approximate calculation should be made of the amount of serviceable stone, lead, timber, and other material that can be obtained from the same for rebuilding and other purposes, and an allowance made for such salvage.

Should the contract be a large one, a considerable amount of cash due to the Contractor will, in all probability, be kept in hand during the "retention period." If the Contractor has to make financial arrangements to meet this contingency he should provide for same in his tender.

A perusal of the quantities should also be made before pricing them up in order to discover any possible discrepancies in the measurements, etc. It is not an uncommon occurrence to find items intended to be read as yards, inserted as feet, also cubes as supers, tons as cwts, and vice versa. These errors if not detected, may have a fatal influence on one's tender.

When the exact current market prices of any goods required for the work are not known, quotations should be obtained from manufacturers and merchants, the prices to include delivery to the site or nearest goods station or siding. The fullest possible particulars of the goods should be given when such enquiries are sent out. An enquiry should also be made into all prime cost of provisional items. They are often subject to a "Trade" as well as a "Cash" discount, although it may not be specifically mentioned in the quantities. It

should be made clear whether the carriage on goods is covered by prime cost or otherwise. This fact is not always disclosed in the quantities and is often a big consideration when tendering.

When a Contractor sublets his slating, plumbing, painting, or other work he usually sends out an enquiry to a few reliable firms on whose quotations he can base his prices with confidence.

The foregoing points will furnish the reader with a general idea of what has to be taken into consideration when tendering, but, of course, each tender brings with it its particular difficulties and have to be dealt with accordingly.

It is wise before going to the trouble and expense of working up a tender to ascertain if the competition is really *bona fide*, also if there is any possibility of the proposed work not being carried out. It may transpire after minute enquiry that, no matter what the result of the tendering, the contract will ultimately be given to a favoured competitor. Again, Contractors are very often invited to tender for "wild-cat" schemes of adventurous companies or syndicates which have no possible likelihood of maturing into genuine business, and therefore would only incur a waste of time and money.

Contractors sometimes receive invitations to tender for work, and owing to business pressure or some other cause they are unable to legitimately respond. In some cases refusal may give offence and greatly prejudice the Contractor's chance of receiving further invitations from the same quarter. Usually the course adopted to overcome the difficulty is to obtain a figure for the tender from another contracting firm which is giving the matter serious consideration. Such information is only exchanged between firms who have the fullest confidence in each other. This practice, although not openly admitted, is, nevertheless, universally condoned by the "trade." It, of course, has disadvantages owing to liability of abuse.

Before submitting a tender a Contractor should thoroughly acquaint himself with the general conditions of the form of contract he is expected to sign, especially in the case of public bodies, as they often include objectionable or unreasonable clauses in regard to local wages and labour conditions, penalties, payments, arbitrators, etc.

Contractors are often called upon to submit tenders for work for which bills of quantities are not provided, they also have to prepare sundry estimates for "extra" work, variations to contracts in progress, etc., which require careful and expert handling, and which all progressive Contractors and their assistants should be perfectly qualified to perform when occasions arise.

After a tender has been submitted, the Contractor should keep in touch with the Architect until he learns the result of same. If the tender proves unsuccessful the bills of quantities, quotations, and all other documents relating to same should be tied up into a parcel and placed away in a cabinet ready for future reference. In order to make such reference easy, each parcel should be numbered consecutively. Application to the Architect for the return of any "deposit" cheque sent him should not be forgotten. Finally a list of tenders should, whenever possible, be obtained by the Contractor and inserted in the memoranda book or register mentioned at the commencement of this article. A record of this kind is found to be an invaluable guide to the Contractor in comparing his schedule of prices (in the aggregate) with his competitors. It also serves as a record of the likely firms he has to compete against under particular architects.

Owing to the uncertain condition of things which prevailed during the period immediately following the Great War, the National Federation of Building Trades Employers recommended their members to attach the following protective clause to their tenders, but lately on the return to a more normal state the clause has been generally discarded :—

"This Estimate is based on the prices of materials and rates of wages prevailing to-day. Any fluctuations in the prices of materials, or rates of wages, must be adjusted in the making up of accounts, either by adding to, or deducting from, original prices and rates."

If, however, a clause of this character governs a contract, quotations should be obtained, at the commencement of the work, for material to be used in the contract, and a schedule of prices should then be tabulated and filed away for reference, and production to the Architect at settlement, if necessary. Further, should the rates of wages be affected, a weekly record of the hours of the various tradesmen and labourers engaged

in connection with the contract, "on the site or otherwise," should be made up ready for the purpose of inclusion in the final account for the contract.

It sometimes transpires that a considerable period elapses between the date when a tender is submitted and its acceptance by the Building Owner. These delays often have a disastrous effect on the tender, and in such circumstances the Contractor, if he thinks advisable, is perfectly justified in withdrawing his tender.

- (a) Rates of wages and prices of material may have advanced.
- (b) A scarcity of labour and shortage of material may have arisen.
- (c) Plant and equipment available when tendering may have, in the meantime, been requisitioned for service on other work.
- (d) Financing same may be more complicated.

These and several other considerations may have presented themselves, and if tactfully pointed out will seldom prejudice the Contractor's relations with the Architect or Building Owner.

Labour Problems.—In any commercial enterprise, keeping expenses down is the problem all business men should consider thoroughly. Labour, whether of brain or muscle, is the big expense. The wages bill is a serious profit reducer, and therefore the chief thing to guard against is unnecessary labour, and the economy to be aimed at is to do essential work with the least expenditure of human labour.

Taking into account the importance of labour in our commercial life it is well to briefly consider at the outset the difficulties which continually agitate the minds of most of our leading commercial and labour men, as well as the general business public.

The position of Great Britain as the foremost industrial power will depend upon the future relations of employers and employed. These cannot be pictured at present as entirely satisfactory. In the past few years high wages and scarcity of labour have done much to keep in abeyance the worst manifestations of industrial unrest. There has been a perpetual conflict between master and man on the one side to depress wages, and on the other to fix them, both methods

being irrespective of output. The average employer has resented a skilful worker earning more than a weekly amount deemed sufficient for his scale of living. Organised labour, partly on account of this prejudice against paying a man what he is worth, has insisted upon a uniform and stationary wage, which shall be paid alike to the good and indifferent worker. This uniformity has only been possible by restricting hours and production, with the result that the average has been fixed by the capacity of the slower members of the trade unions and the rapid worker has been penalised by the incompetency of his comrades. These restrictions react greatly to the detriment of British competition with more enterprising foreign trade rivals.

Trade union conditions in America, however, are based upon the reverse principle. The minimum amount a man is expected to do either in an eight-hour day or on piecework is fixed, and if he falls below that scale, he is regarded as inefficient. There is no limitation upon the amount he may do, nor is there any reluctance to pay him the full value of his services. Indeed, in many cases, prizes are awarded for the biggest production. Workers are encouraged to do their best and are paid proportionately. This is a business undertaking so obviously satisfactory to all parties concerned, that it seems trite to set it forth in print. Yet there has been in this country a conflict between master and man ever since we became a great industrial nation. It can truthfully be asserted that many a forward movement on the part of labour towards better conditions has been opposed almost as a matter of duty by employers, and conversely production and efficiency have been countered by the workers, both acting, as they think, in the interests of their members and the trade generally.

One of our chief needs, therefore, at the present day is mutual confidence and respect of both employers and employed, and their chief duty should be a combined effort to effect mutual goodwill for the proper regularisation of wages and prevention of unemployment. Our model Contractor will, therefore, take a keen, lively, and sympathetic interest in all matters relating to this and other questions that come up for consideration at various times at the meetings of his local trade association.

In touching upon employment we may here mention that

the chief methods adopted in the building trade for obtaining labour have been :—

- (a) Advertising in local papers.
- (b) Applying to local employment exchanges.
- (c) Notifying local trade lodges and representatives of one's requirements.

All these methods give more or less satisfactory results, but much depends upon circumstances and conditions prevailing.

The indifference shown by some building employers in the mode of payment of wages is often the cause of dissatisfaction amongst workers. There should be no delay on any pretext. On the recognised pay-day the wages should be ready for the workmen where and when they finish their day's work, whether it be at the yard (at headquarters) or on a contract.

As a check wages should be paid out by someone from the office, and when payment is made each man should be requested to state the number of hours he has worked in the week and the amount of subs he has received. Any difference between the foreman's report and the workmen's statement should be enquired into and rectified. This system will have a very salutary effect upon all parties, especially in quarters where there may be a tendency to questionable dealing.

CHAPTER III

ADMINISTRATION OF CONTRACTS

It is absolutely necessary, in order that the various trades should work in harmony and conjunction with each other during the progress of contract, that the spirit of despatch should dominate our actions to a very great extent.

Despatch in fixing up all details and settling of problems affecting the contract with the Architect.

Despatch in getting plant on to the site and removing same when not required.

Despatch in ordering and securing material.

„ in obtaining and distributing labour, etc., etc.

Procrastination, or the policy of generally muddling through, is suicidal from a profit-producing standpoint.

Before workmen are ordered to any job, the question of materials, tools, and plant should have prior consideration, and unless this is done despatch is not likely to result.

It is with the object of pointing out methods by which general matters appertaining to the contract can be facilitated, that the following survey is given.

Let it be assumed that a letter has been received from an Architect notifying a Contractor that his tender for a contract has been accepted and that he is allowed a fortnight to check the quantities. The Architect expresses a desire that he should receive a copy of the priced Bill of Quantities forthwith. It is, of course, taken for granted that the tender has been accepted within a reasonable time, and the prices of labour and material have not adversely affected the position of the Contractor.

After acknowledgment, this letter should be sent to the Inland Revenue Office to be stamped with a sixpenny stamp. Between the receipt of this letter and the actual signing of the contract, there are several matters which need attention.

On the receipt of such a communication the first question that invariably occurs to a Contractor is: How does my tender compare with those of my competitors?

It is quite a natural observation. Mistakes happen with

the most careful people, and are certainly pardonable in the rush usually experienced in getting a tender through in the very limited time often allowed by architects. Through an error in calculation, or addition, or from some other cause, the tender may have come out exceptionally low compared with competitors, and may give reasonable ground for doubts.

At this stage architects are not always willing to concede a list of tenders, but with a little tact, enough information can usually be gathered from competitors to guide one, especially when they are assured that their confidence will be respected. If one is in a reasonable position on the list of tenders a sense of assurance and confidence is created in regard to the financial prospect of the contract.

Before submitting the priced Bill of Quantities to the Architect, all prices should be thoroughly scrutinised and calculations and additions carefully checked. It is at this juncture that any discrepancies can be adjusted without materially affecting the total of the tender. The Quantities should afterwards be checked. It is not advisable to take them for granted under any circumstances, as the most expert surveyors are apt to make errors in some form or other, and this makes it essential that the Contractor's closest attention be given to the matter. These mistakes are often of a most unexpected character, such as the "omissions" or "shortages" of some of the following items :—

Floating to concrete floors.

Digging to road surface to main drain and making good.

Bends, junctions, etc., to drains.

Temporary shuttering, centring, centres, and turnpieces.

Relieving arches.

Holes and bolts, joggled ends, cleats, etc., to girders.

Building in ends of girders, joists, etc.

Pointing to walls.

Lead soakers.

Painting of sashes measured one side only.

Cubes put in as supers.

Yards put in as feet, etc. etc.

The necessary preliminary to the checking of a Bill of Quantities is a careful study of the Specification.

Architects will often lend the Contractor their rough Bill of Quantities for the purpose of checking. This sometimes

obviates the necessity of the Architect explaining a lot of items in the Bill. Some contractors in checking quantities satisfy themselves first that most of the principal items are included, leaving the smaller items more or less to chance. They argue that it is the bigger items which tell, and that it is on these that the surveyor is generally found wanting. Their policy is to focus all their attention on them, and when they find a few substantial errors insist on their rectification before committing themselves to the contract, but if time permits the quantities should be thoroughly and minutely checked whenever possible. A letter from the Architect confirming and agreeing to allow for any shortages discovered is the usual course adopted in settling the matter. It is not wise to trouble architects about trifling items, especially at this stage.

If the business reputation, resources, and financial position of the Building Owner are not already known to the Contractor, they should be investigated. Information can often be obtained from the Architect, private agencies, or one's own banker. General information may also be gathered respecting the Architect's customary treatment of contractors. These considerations have a very important bearing on the undertaking, and the Contractor should receive a favourable assurance to each before proceeding with the work. Many failures can be attributed to the neglect of these preliminary but most necessary investigations.

If a Committee constitutes the Building Owner, such as a Church Committee, Club, or Political Institute, the contract should be signed by each and every responsible member. It is also wise to make absolutely certain that the signatories constitute good securities. If entire satisfaction cannot be obtained in this respect, some other form of substantial security should be insisted upon. It is obvious that in dealings with committees one should be exceedingly careful.

If the work is required to be executed for a limited or public authority the contract should bear their seal. Should the Contractor subsequently learn that the Building Owner is utterly incapable of properly financing the contract, he has every justification in withdrawing his tender and claiming compensation for the trouble and out-of-pocket expenses he has incurred in tendering, checking quantities, and attending to other necessary preliminaries.

If sureties are required from the Contractor, and private ones are not obtainable, the Contractor will be well advised to seek the assistance of one of the first-class Guarantee or Insurance offices. An allowance should, of course, be made for this contingency when tendering.

There is a movement on foot amongst contractors to secure a more equitable form of contract. To a great extent this is due to the existence of clauses in the Contract Form of several public bodies, such as that of investing the Architect with the power of being sole arbitrator, etc., which creates a decidedly unfair condition of things from a Contractor's point of view. In common fairness he should have the right of appeal to an independent and disinterested party. The trade as a whole is beginning to realise the gravity of embarking on work done under such conditions, and it is to be hoped that the matter will shortly be rectified by the inclusion of a clause in all contracts allowing for independent arbitrators.

When drawing up the form of contract it sometimes happens that the Architect nominates an Arbitrator whom the Contractor considers may be prejudicial to his interests. Under such circumstances the Contractor should respectfully state his objection, and at the same time nominate some other gentleman eligible to act in the capacity and who may prove acceptable to all parties concerned. With a little tact this course usually produces the desired effect.

Touching on the question of the payment of half the retention amount usually due at completion of contract, the Contractor has often a difficulty in getting the Architect to certify in anything like a reasonable time. Some architects seem to adopt a wilful policy of drift, and allow several months to elapse before they can be prevailed upon to give the matter attention. Such delays are likely to cause financial embarrassment, in addition to which the longer the issue of such certificate is delayed the more remote will become the date for final settlement. Contractors should, if possible, endeavour to have a protecting clause inserted in their contracts which would entitle them to a certificate within a stated period after due notice of completion has been served on the Architect, unless in the interim a legitimate reason can be brought forward for withholding same.

Regarding delay in commencing contract, a clause should be inserted providing that where the contract work is post-

poned through causes which are not the fault of the Contractor, and over which he has no control, the Building Owner should pay the Contractor any increase in wages and prices of material that may occur during the period of delay, as already pointed out in one of our previous chapters.

Subletting.—A small Contractor will often find that it is economical to sublet a portion of his work. He will, for instance, in the case of dressed stonework, joinery, slating, plumbing, etc., avoid the purchase of expensive tools and plant. With dressed stonework, diamond saws, planing machine, cranes, etc., are necessary to the modern stone contractor, just as wood-working machinery is to the up-to-date joinery manufacturer. He will also obviate the necessity of renting expensive premises and paying workmen's compensation and fire insurance. In fact he will know exactly what the goods or work will cost him before he actually places his order, even though his profit may be less at the completion of the job. It should be made clear in the contract that the Contractor will only be liable for the defective work of those sub-contractors nominated, or engaged, by him. Architects often endeavour to place the liability for work of sub-contractors whom they engage upon the shoulders of the general Contractor.

When the right to ownership of plant and material on the site during the progress of the work is claimed under the contract by the Building Owner, the Contractor should claim the compensatory right of including for the value of such plant when payment is made to him on account of the contract. If a verbal promise is made by the Architect allowing surplus soil or excavation to be deposited at any particular spot, or allowing any other concessions, the Contractor should have a letter or some other documentary evidence confirming such concessions before signing the contract, and thus avoid any misunderstanding that may afterwards arise.

With regard to the contract, the Contractor should obtain a copy of same signed by the Building Owner. This should be deposited in a safe place handy for reference. The Contractor should see to it that the actual contract is properly completed by all parties, otherwise he may discover at some inconvenient time that no legal document exists. This is not an unusual occurrence. Contractors often leave such matters to the Architect and have reason sometimes to repent it.

Endeavour to secure the very best trade and cash discount

terms from all firms mentioned in the prime cost items in the Quantities. These terms and prices should be accepted forthwith, and goods or work ordered conditionally that the same be supplied or executed at the time required under the contract and to the Architect's entire satisfaction.

When there is any likelihood of any legal contentions arising from questions such as party walls, ancient lights, etc., the Contractor should have a clause inserted in the contract indemnifying him from all liability in connection therewith, and one covering him for any compensation in respect of any loss he may incur as a consequence of such contentions. It is well to have a telephonic connection between the Contractor's office and the office on a contract whenever practicable.

As already intimated, there is a movement on foot at present to promote the adoption of a National Building Code or Contract Form, and the following extract on the subject from the last report of the National Federation of Building Trades Employers of Great Britain and Ireland will place before the reader the official attitude thereto :—

“ PRESENT POSITION RE CONTRACT FORMS.

The Administrative Committee of the National Federation (and the Building Code Committee) earnestly represent to the members of the Federation that the following Forms of Contract should not on any account be accepted or signed :—

R.I.B.A. new Form, 1920.

S.A. new Form, 1920.

Any private Forms, however simply drawn, except under Solicitor's advice.

The R.I.B.A. Form of 1909, which was an agreed Form up to last year, can still be obtained, but we do not recommend any of our Members to sign it.

NATIONAL BUILDING CODE.

Every large Association should form a small Working Committee and meet the local Architects and Surveyors, explaining the National Code to them, and the reasons for its adoption, and pressing for its use locally at a very early date.

Objections met with should be put into writing and sent on to the Building Code Committee for their use.

To meet the need for a Contract Form for the present, Associations should agree for the present with the local professional bodies—

(1) Not to sign contracts at all, but to take written orders with definite arrangements as to payments on account, or

(2) Agree to use the old National Form, which can still be obtained from Bedford Square.

The Committee strongly advise each Regional Federation to hold a special Executive."

CHAPTER IV

THE ARCHITECT

IT is an obviously sound dictum that the wisest course for a Contractor to adopt is to be at all times on the best terms possible with his Architect. Differences often arise between Contractor and Architect, but they should invariably be removed as quickly as possible. When commencing a contract under an Architect with whom he has previously worked, a Contractor will know from experience how to deal with him. Should, however, both Contractor and Architect be business strangers, the Contractor should endeavour to carry out his contract to the letter and in its true and proper spirit. Most Architects are fair and reasonable, and it is a pleasure and privilege to do business with them.

As soon as it has been decided to proceed with the contract, the following matters should be arranged :—

A written authority should be obtained from the Architect before starting. The acceptance of " verbal " orders should be avoided. Legal complications often crop up when contracts are started, and if the Contractor commences operations without proper authority the onus of any action may fall upon him.

Enquire whether the plans have been passed by the local authorities. In some districts it would be courting trouble to proceed with any building operations without the authorities' approval. This fact is often overlooked by architects.

If a Contractor has to prepare plans for passing local authorities the necessary information for block plan, etc., can be obtained from local ordnance map, which may be seen at the local Surveyor's office.

If the Quantities and Specifications are lithographed or printed, endeavour to obtain a few spare copies from the Architect. It is practically a necessity for smooth working.

The pegging-out of the site should be done by the Contractor and, if possible, verified immediately by the

Architect, or his representative. This work is too often relegated entirely to the Contractor's foreman.

A Contractor's dumpy-level and levelling staff are often essential for correctness and despatch in levelling off a site ready for building operations.

A request should be made to the Architect for the return of a Quantity Deposit cheque that may have been given him, i.e. unless it has not already been returned.

If any special heating and lighting schemes have to be carried out, working particulars should now be obtained from the Architect (or the sub-contractor commissioned to do the work) so that all the necessary holes and chases for pipes can be "cut" or "formed" as the work proceeds. This course often saves a considerable amount of unnecessary labour later on. Working particulars should also be obtained of any special item which the Architect may have to deal with in his prime cost amounts, such as strong-room doors, ventilators, lifts, iron sashes, sanitary work, etc., so that proper openings can be allowed for them. Also a request should be made for joinery, stonework, and steelwork details to enable the work to be put in hand without delay.

Some architects by their dilatory methods do not appear to realise or appreciate the significance of promptitude in furnishing details to the Contractor, while they are invariably the first to attach blame should the progress of the work be below the looked-for standard. When a Contractor finds his progress hindered by lack of details and feels there is little immediate hope of obtaining them, he should immediately prepare details for himself from the contract Specification and submit them to the Architect for his approval.

If these are properly set out, they will probably pass muster. In any case it will produce the effect of bringing the Architect to realise that the Contractor wishes to get ahead and cannot afford to delay his work.

Nothing warrants an Architect keeping any part of the work behind for want of details, all such delays being most detrimental to the Contractor's interests. One of the essentials in maintaining orderly, successful building operations is the work of all trades proceeding in their natural order. Therefore, to obtain this desirable condition of things, particulars of all trade items must be obtained well in advance,

so that materials, etc., can be ordered in good time and be on the job exactly when required.

Should the Architect or Building Owner unnecessarily delay or interrupt the work, or withhold its progress entirely for any period, a written notice should be served on them of their liability for compensation for all loss sustained by the Contractor. This will serve the purpose of protecting the Contractor's interests when the final settlement is being arranged, and may also shorten the period of cessation. These stoppages are frequently brought about by influences which the Building Owners are unable to control, but a greater effort is likely to be made to resume progress when it is made perfectly clear to them that the Contractor will insist on being fully compensated.

A foreman, and perhaps a portion of his staff, may have to be kept practically in idleness, the plant is also prevented from earning any revenue, and there is the likelihood and risk of advance in both wages and prices of material, as well as other circumstances which may arise to affect the Contractor's position whilst building operations are being held up.

The Contractor should not fail to include in his statement, when applying for first instalments on account of work done, the surveyor's fees, lithography, and other charges, and, what is more important still, he should see that a cheque is forwarded to the Architect covering these amounts immediately the certificate has been paid. A little consideration such as this is nearly always appreciated by the Architect.

It is well to mention here that the architectural merits or defects of any building which a Contractor has in hand does not as a rule concern him, but the structural soundness of the design should. Therefore when any doubt arises as to the wisdom of proceeding with any portion of the work through any apparent weak constructural design, the Architect's attention should be tactfully drawn to it. If the Architect decides to follow his original intention, and the Contractor still thinks such a course unwise, a letter should be sent to the Architect placing on him the responsibility for the same.

If after completion and settlement of contract the Building Owner makes complaints to the Contractor in regard to the work executed, he should be referred to the Architect. Some clients consider they have a freehold on a Contractor's services in respect to work carried out for them.

CHAPTER V

THE GENERAL FOREMAN

AT the commencement of a contract the most important duty a Contractor has to perform is the selection of the general foreman to carry out and undertake the responsibility for the work, his duty being to direct all trades connected therewith. If the Contractor has in his employ one or two men who have already acted for him in a similar capacity, his task is not difficult ; but should he have to select a stranger, the matter becomes more complicated. Such a selection is a serious undertaking, as the foreman is the one man who can either make or mar the profitable working of the job. This point is not always realised, and its oversight will explain many failures in "Contracting."

It is sometimes found more economical to run a contract with relays of two or three different classes of foreman. For instance, if the job is a stone or brick one, a foreman mason or bricklayer may be put in charge until the shell of the building has been completed ; then another, who is a specialist in carpentry and general inside fitting, may take the lead of the job, to be subsequently replaced by a foreman painter and decorator for the finishing processes.

There are many men who have the theory of building construction at their finger-ends, but fail lamentably when practical application of same has to be made.

Should a foreman prove unsatisfactory after a fair trial, and, as a consequence, the financial or monetary outlook of the contract be considerably prejudiced, the Contractor should not hesitate to take the only course compatible with his duty, that of immediately placing a more efficient man in charge.

A qualified foreman should be well paid. Cheapness in this direction, as in most others, is not economical in the long run. Good service can be demanded, and is usually given, where proper recognition is made. By giving a foreman fair or generous treatment in regard to his wages an incentive is often produced for him to thoroughly and whole-heartedly identify himself with his work.

Some foremen show to advantage on a brick "job," whilst others are preferable on a stone contract, or on one which has a good proportion of timber and ironwork. It is chiefly from personal experience that one is best able to discriminate in regard to the special qualifications of men in this respect. From general experience, however, it has been found that foremen who are masons by trade prove, on the whole, the most suitable for general contract work.

Although evidence of "Technical" as well as "Practical" knowledge is desirable when making a selection of a foreman, it is well to give warning that a candidate should not be selected on the strength of any certificates, diplomas, or testimonials from public officials. These count for very little with practical contractors—in fact, many applicants who submit architects' and such-like testimonials more often than not prejudice their application. The only really capable judges of a foreman's capabilities are his employers, and it is their experience of him that should invariably be obtained and considered before making a selection.

A foreman should be discreet and courteous to all, and especially to those in authority, such as the Architect, Clerk of Works, etc., otherwise his attitude may prove more serious for his employer at the time of settlement of accounts than any saving he may have effected through his ability in the supervision of the work.

A foreman should have a sound, practical and general knowledge of building operations, and have the ability to see a little ahead of the work in hand. He must also have a knowledge of plans and quantities, be correct in regard to scales and the reading of figures, must be scrupulously honest both in regard to financial matters, and the treatment of "extra" work. He should possess tact with workmen and have a force of character which they will respect, so that his word will be law on the job without having recourse to any suggestion of aggression.

He should be able to determine how long a particular piece of work should occupy a workman, also whether his men are well and fully employed. It will also be left to the discretion of the general foreman to employ, if necessary, sectional foremen or leading hands for the various trades.

It should be clearly understood at the outset that all purchases of material will be conducted through the Contractor's office. Foremen on jobs may be useful in providing data in

regard to local tradesmen, etc., but, as a rule, they have neither the time nor training to deal satisfactorily with the purchasing of goods. Apart from these considerations, the principle of giving foremen a free hand in that direction, as well as in the payment of wages, has caused, either through carelessness or dishonesty, serious loss to many contractors. The system on that account should be studiously avoided.

We will assume that a foreman has been selected and has been given the opportunity of studying the plans and specifications, and that arrangements have been made for an immediate start with the contract.

The Contractor should visit the site with his foreman and have a fairly exhaustive consultation on the forthcoming operations to decide upon the general policy to be pursued. Any doubtful points which may have cropped up in the mind of the foreman on examining the plans can be explained or at least discussed. There should be a mutual understanding and absolute confidence before the work is started. A Contractor should in no case interfere with the authority of the foreman, and all instructions or orders should be given through him. This is essential for proper discipline and control, especially where large numbers of workmen are concerned.

A list should be made of the first lot of plant, etc., necessary for the job, and the position in which it has to be placed should be agreed upon.

The reader will find on page 293 a short list of plant generally used in the various trades. It has been compiled to ensure easy reference. These lists can be consulted from time to time as the various trades are ready to start operations. It is not an uncommon occurrence for foremen, as well as workmen, to discover that there is a shortage of various classes of material, tools, or plant just as they actually require them. Annoying and costly as this is, even when the job is situated in the same town as the Contractor's headquarters, it becomes even more troublesome and expensive when the work happens to be out of town. Mistakes of this character should be avoided, and the Contractor should impress upon the foreman the necessity of keeping the office well advised of his requirements in this respect. Again, it is false economy to let tradesmen wait for materials. It is better to have a small number of workmen with ample supplies than a large staff with scanty material. Men work with more will when they see plenty of

material in front of them than when there is a shortage. It is the foreman's duty to see that the scaffolds are always ready with materials loaded on them waiting for the man, and apart from the fact that such a course tends to economy, the tradesmen prefer it to "killing time."

Foremen or workmen in charge of work should be instructed to get into immediate communication with the office, either by telephone or other means, whenever they are held up for want of labour or material. Some workmen will under such circumstances spend days pottering about in the hope that the Contractor or his representative will turn up, instead of making their wants known straight away.

The foreman should be provided with :—

1. A suitable office on the job.
2. Copies of plans and specifications supplied by Architect.
3. Official notepaper, envelopes, post cards, etc., for correspondence to the Contractor's office only. (The correspondence of a foreman should chiefly be confined to the head office, which should deal with all matters from outside relating to the work.)
4. A specific cash balance for the purpose of "subbing" workmen. This should be increased or decreased as circumstances demand.
6. Time-books, weekly pay-sheets, material sheets, day-work sheets, and extra or variation sheets.

An illustration of a material and extra sheet will be found on pages 31 and 32, and a pay-sheet can be seen on page 232. These examples hardly need any explanation.

The foreman should be instructed to send with his weekly pay-sheet a material and extra sheet, together with all delivery notes received for goods delivered to the job during the week. These notes should be initialled by the foreman. If there is a Clerk of Works on the job, the foreman should get him to sign all extra sheets before remitting them to office. This will eliminate any question in regard to their veracity at any later date. The foreman will, of course, endeavour to work as amicably as possible with the Clerk of Works.

If considered necessary, a record should be kept by the foreman of the days on which the contract has been delayed by wet weather, etc. (see notes on page 197, in regard to foreman's duties with breakages and shortages).

MATERIAL SHEET

Weekly Account of Materials.

Albion Hotel,

WEEK ENDING 6th July.

Date.	Lds.	Materials.	Tk. No.	From whom received.	Haulie:-
June 30	— 3	Stone crusher Bricks (1300)	— —	Mainwaring Bros. Hospital	Own carts Dickson
	12	T. C. Crushed stone, 20 5	—	Cinema	Own carts
July 1	1	22 Bags cement	6942	G.W.R.	"
	1	T. C. Ballast, 1 15	5873	L. & N.W.R. Yard	"
	2	Mortar	—	"	"
	2	T. C. Walling stone, 9 12	976	L. & N.W.R.	Dickson
July 2	2	Sand, 8 8	4794	G.W.R.	"

All material and plant sent back to yard or on to other jobs to be entered on the other side.

EXTRAS SHEET

No. 22.

Account of "EXTRA WORK"

*Executed by Surrey & Kent, Birmingham*WEEK ENDING *June 10th.**At Albion Hotel,*

Description.	Trade.	Hours.	Material used.
Drilling and plugging for lavatories, urinal flush cisterns, etc., for plumbing contractors	} Carpenter.	20	
Cutting away walling for 3 ventilators under new floors, and fixing vents	} Mason.	8½	
Cutting holes for ventilator and making flues under floors of passages	} Mason. } Labourer.	8½ 8½	3 barrows mortar. 23 ft. x 1'-0" x 2" paving.

The foreman should be personally informed and also reminded by letter that no "verbal" orders for extra work (from either Architect, Clerk of Works, or Building Owner) are to be executed without the Contractor's authority. Written orders should be demanded if the work is being pressed for, and, although this may sometimes cause a little inconvenience, the rule should be insisted upon.

If the Contractor performs his own haulage on the job the foreman need only book the haulier's time along with the other workmen; but when hired haulage is employed the foreman should fill in details of the work they perform on a specially printed haulage sheet, similar to the haulage book (page 255). These sheets should be sent in with the weekly pay-sheets, etc. An arrangement should be made that all accounts for hired carts, etc., be rendered weekly, or fortnightly at the outside, so that they can be immediately checked with the foreman's returns and any discrepancy rectified without delay.

The foreman should acquaint the office at all times if there is any undue delay in the delivery of goods of which he has been advised as having been despatched to his job, in order that steps may be taken to expedite delivery.

It is well to see that the foreman is provided with a pocket-book so that he can jot down notes and queries as they occur to him. It is no uncommon occurrence for the foreman to omit settling important questions with his employer simply from neglect of making a note as a reminder. Foremen as a class rely on their memories, which are not always of the best. When a Contractor visits a job he usually plies the foreman with various questions, and in giving his attention to these matters the foreman often overlooks his own queries. The nature of his work is such that his employer cannot expect him to retain all matters in his memory, and there is nothing so exasperating to a foreman, and annoying to a Contractor, as to find sundry problems not dealt with for want of a little reminder at the right time.

Where old buildings have to be pulled down and trenches excavated for new buildings, the foreman should note the various depths of the ground-line, so that the excavation items, etc., on quantities can be checked. Again, should the Architect instruct the foreman to leave any timber in the trenches for strutting purposes, particulars and measurements

of it should be reported at once to the office, so that the proper extra charge can be made up for same.

The item "assist all trades" (generally found in most Bills of Quantities) is often the cause of much misunderstanding between the Contractor's foreman and subcontractor's men.

Some subcontractors take such extreme and unreasonable views of the Contractor's obligations that, were they not held in check, they would commandeer a large percentage of the labour they need for the execution of their "legitimate" work. The Contractor's foreman should therefore be instructed that he should on no account give special assistance to the subcontractor unless arrangements have been made for the payment of same. Should any question arise on this point that cannot be mutually agreed upon, then the Architect's decision should be sought.

Some contractors rely on their foremen for particulars of the material they require for their job. This is often a disastrous policy to pursue and should not be countenanced by any up-to-date Contractor, as it should be his business to know the requirements of all his contracts, in order to avoid waste. The means of gathering such information are usually at his disposal in his office. He may, of course, be guided a little by his foreman in regard to the time the various materials should be placed on the job; but the actual quantities to be supplied can be more accurately worked out from the plans. As a rule, foremen have very vague ideas of the actual quantities of material required for any large amount of work.

When no delivery notes are supplied by senders, duplicates of invoices should be sent to the foreman for his guidance when goods come to hand. Of course, it is unnecessary to give any prices in these duplicates. A foreman should be held responsible for all material delivered to his contract. It is not suggested that he should personally check everything, as usually there is no lack of assistance in that direction; but he should satisfy himself in some way that whatever has been invoiced to his job has been duly received or otherwise. Short delivery of bricks, cement, stone, and other commodities is not entirely unknown.

Finally, it is important to impress upon the foreman that it is his duty to take more interest in the arrangements for the scaffolding than is usually done. More work and general service can be got out of a good scaffold than one of doubtful stability. It should, therefore, be his particular care.

CHAPTER VI

PRELIMINARIES TO BUILDING OPERATIONS

As has already been pointed out, it is an unwise proceeding to start any building operations without first obtaining definite instructions from the Architect or Building Owner, especially when any pulling down or structural alterations have to be done. The possibility of legal complications is too great to allow for any neglect in this respect, and this fact should not be overlooked.

Building operations are, in one respect, very similar to Land operations : " We get out of them in proportion to what we put into them." If, therefore, tangible benefit is expected from a contract, energetic attention must be given to all matters relating to same.

There are of necessity several sundry duties, etc., to be performed at the commencement of a contract. We will endeavour to enumerate a few :—

The leading particulars of a contract should be entered into a " Contract Accounts Book " (see page 265). This is a book set apart for the purpose of registering all deviations from the contract, no matter what form they take.

A letter should be sent to the local surveyor stating that the contract is about to proceed and enquiring if he desires any special notices for inspection sent him at the various stages of the work, such as at the " completion of excavation," " drains," " concrete floors," etc.

A list of plant, hoardings, etc., required to make a good start on the job should now be made out and arrangements made for the transport of same to the site.

Insure against fire risk all plant sent to the job, such as engines, mortar mills, cranes, tools, mess-room stores and contents, etc. The premium for such risk is so very moderate that it is unwise to neglect taking cover (see page 171).

Engines should be well examined and tested and, if found necessary, repaired before being put into actual working operation. If the engine is insured, the insurance company will do the necessary examination, testing, and reporting.

A notice warning trespassers should be placed on the front hoarding or some other suitable place. It should be worded on the following lines :—

“ Take notice that any person or persons found trespassing on this building now being erected on this site, or doing damage thereto or taking any materials away therefrom, will be prosecuted. A. & B.,
Contractors.”

Where “ alterations and additions ” have to be made to any existing buildings connected with the contract, the Building Owner or Architect should be notified that it would be advisable to get the permanent policy endorsed in respect of such alterations, to prevent any complication arising in case of fire. This remark also applies to any policy covering “ furniture ” that may be stored on the building. These matters often get overlooked.

Should the contract include any special risks, such as (1) pulling down, (2) erection of specially high buildings, (3) quarry blasting, etc., which may not be covered by the ordinary Workmen’s Compensation policy taken out by the firm, cover should now be obtained for the risks.

The premiums for these special risks are usually fixed by Tariff Offices.

Public property, third party, and driver’s risks should on no account be overlooked.

As already suggested, the question of subletting should also receive attention. There are many trades, such as joinery, plumbing, slating, painting, etc., that can often be sublet with advantage to firms who specialise in these branches.

For an out-of-town job an arrangement should be made for a “ monthly ” or “ ledger ” account at the railway goods station to which it is intended to have the bulk of the traffic sent. During the progress of a contract numerous carriage charges arise, and unless an account is fixed up with the railway company the foreman will naturally have to see to the checking and paying of them. This causes a waste of time and often is the source of worry and annoyance. Matters of this kind should be dealt with at the office, the foreman being relieved of them wherever possible. The reader will find on page 185 a chapter which deals exclusively with railway charges.

It may here be mentioned that conveyance by canals often

proves most economical, so that if there is one in close proximity to the job it would be well to consider the suggestion.

Whilst on the subject of railway matters it is well to expose and condemn a very irritating practice which is being persisted in by many sub-contracting firms, namely, that of endeavouring to place the responsibility for the carriage of their goods and plant (both to and from the job) on the shoulder of the Building Contractor. Their goods, etc., often arrive at the job "Carriage Forward," and are again consigned from the job in the name of the Building Contractor. Both transactions in due course find their way into the Contractor's general "carriage" account. Consequently, unless a sharp and intelligent check is kept, the Contractor suffers.

An index should be made of the general items in the Bills of Quantities and Specification and attached to each. This will be found a great assistance when constant reference has to be made to the various items.

A detailed list of materials required for the various trades should now be very carefully prepared so as to be ready for ordering when required. This is important, as the work should not for a moment be impeded for want of material if it can be avoided. Delays, as a rule, are ruinous to a Contractor.

A "one-inch" scale plan of the building showing all sizes and thicknesses, etc., of the walls, openings, rooms, etc., should be drawn out from the Architect's $\frac{1}{8}$ " or $\frac{1}{2}$ " plans. Such a plan has been proved of great value at the office and on the job, and is well worth the extra trouble needed to do same. Should the building be a large one with numerous rooms it will be found a great saving of time to have all the rooms numbered on all the plans.

This method of numbering the various rooms, etc., facilitate matters greatly when issuing instructions as to the position in which the various classes of joinery, ironmongery, etc., have to be fixed.

A list of window and door openings with full detailed particulars of the linings, jambs, and other finishings should be made out and given to the joiners' shop foreman, and the foreman on the work for their guidance.

If a large quantity of common or stock bricks is required it will sometimes be found advisable to divide up the orders for their supply between two or three brickmakers whose

bricks are the same size and quality and can be worked in together.

This course will ensure a regular supply being maintained. Breakdowns in machinery, labour troubles, and various other causes of delay occur at works, and the precaution mentioned above will minimise the risk of the job being held up for the want of any one make of brick. A contract should be entered into with each maker for the supply of a given quantity at a fixed price, the bricks to be supplied "when required" and "over a given period."

Any common "splay," or other specially shaped brick, required for window or door jambs, etc., should be ordered with the first batch of common bricks, so that they can be put in hand without delay and got on to the job in good time. Matters of this kind are often overlooked.

Iron and steelwork (joists, girders, stanchions, etc.) should also be put in hand as soon as correct details and dimensions are obtainable for ordering. This cannot be emphasised too strongly as, perhaps, nothing upsets or interferes with the general progress of job as much as delay in the delivery of this class of material.

Coal should be ordered for the engine and rough ashes and lump lime obtained for making mortar. A cart should have high sideboards when hauling ashes, otherwise the cost will be higher than need be.

Although it is much more costly to carry out work on a site that is cramped for room, yet a site which has unlimited space has its disadvantages. Unless proper supervision is exercised material and plant often get distributed at random all over the site, with the result that the cost of fetching and carrying them to their proper position when required is much more than need be.

Enquiries should be sent to the local waterworks authorities for their charges for water to be used on buildings in course of erection and also their regulations governing same. A deposit should then be paid and an order given to get the water connected up for temporary service. This should wherever possible be placed in the position appointed for the permanent supply, to save double expense. Sometimes a lump sum can with advantage be arranged with the authorities for the water used on the building during the course of erection (see pages 11 and 178).

It is now demanded under the "Factory Workshops Act, 1901 and 1907," that an

"Abstract of the provisions of the Act as to buildings in course of erections or repairs "

be posted up somewhere on the job. The abstract is Form 57, and can be obtained from any large stationer's shop.

A point often lost sight of is the amount of time needlessly lost through wet weather. Scarcely any attempt being made by either employers or workmen to overcome the difficulty.

A progressive Contractor will provide himself with a good stock of tarpaulins, light, temporary, portable coverings, sheds, etc., to combat the problem. It is surprising how much time can be saved in this direction when the question of wet weather is taken seriously in hand.

All timber plant, such as trestles, sawing stools, etc., exposed to wet weather should receive a coat of creosote or some other wood-preserving stain immediately after being made.

It should also be seen that all tools, scaffold poles, planks, etc., and plant have the firm's initials clearly branded on them before being sent out to a job, also that a delivery note is made out for them when leaving the yard, in precisely the same manner as is done for other goods. These entries should subsequently be posted to the plant book (which will be explained later). By this process a ready means is provided for locating the whereabouts of various plant when required.

Sheds for lime, cement, and other materials will, of course, be erected. Arrangements should be made in regard to latrines for the men's use. If convenient and satisfactory, make use of any old drains that may be in existence.

If the approach to the site be unsatisfactory for haulage, some sound second-hand wooden sleepers should be laid, or some other suitable arrangement made to ensure a satisfactory cartway.

Should the Contractor employ his own carts for hauling and the work is out of town, it will be found necessary to secure stabling for the horses near the job, unless the Contractor possesses a portable stable. It will further be necessary to make arrangements for a regular supply of horse feed (averaging about $2\frac{1}{4}$ cwt. per horse, per week), and an occasional supply of bedding (see list on page 295 of haulage requisites).

If hired carts are employed a quotation should be obtained for the work from local and other likely haulage contractors, and provided there is no material difference in the matter of price, the work should be given to the haulier who possesses the best supply of horses, carts, trollies, and other facilities for the work, and who will guarantee satisfaction. The haulage contractor should also indemnify the builder against any demurrage that may occur at the railway station through any delay on his part (see page 139). The same remarks apply where motor transport is under consideration.

A fairly good-sized sign should be displayed in a prominent position on the job, giving the name and address of the Contractor, nothing being lost by a little publicity of this kind.

For a town job hoardings, footways, and covered ways should be erected, a licence for same will in all probability have to be obtained from the local authorities. The hoarding can almost invariably be let out for advertising purposes. Some bill-posting firms pay a good price for the privilege. In some towns the authorities claim a certain percentage of the rent received from all hoardings.

Should any telegraph or telephone wires or posts interfere in any way with the new building operations notice should immediately be given to the local postmaster or Post Office Engineering Department for their removal.

If work has to be carried on through the winter season the necessary supply of lighting apparatus should be in readiness on the job. If there is an electric main supply running near the site, and the job is of sufficient size to warrant the expense, it may be preferable to arrange the temporary lighting supply from that source.

If there are any old buildings to be demolished or partly pulled down before proceeding with the new work, care should be taken to ensure the safety of both adjoining property and the workmen employed on the building. Strict attention should be given to all necessary shoring.

Broken bricks and stone unsuitable for other purposes should be put on one side and used for any concreting required. In these days of ferro concrete schemes all old iron, gas, and water-pipes have a distinctive value and should be carefully stored. Joinery and other salvage taken from old buildings should be put on one side ready for sale. Marine and other store dealers often give good prices for this class of

goods, although the best prices for old lead are usually obtainable from the lead manufacturers, from whom the Contractor may be obtaining his new lead. It may also be noted here that specially high prices can often be obtained from local founders for old iron. Where time and space are important factors it is essential that a written guarantee should be obtained from the buyer to remove the goods purchased within a given time, "otherwise the sale will go by default." It is often found that dealers consider their own convenience in preference to the Contractors, once a bargain has been struck for the disposal of the goods.

Taking into consideration the fact that difficulties constantly arise and problems often present themselves during the progress of a contract, a Contractor should endeavour to keep in personal touch with same as much as possible.

It may be that there is a shortage of plant, material, or labour, or possibly the foreman cannot proceed with a particular section of the work without obtaining the Contractor's advice or decision on some point in relation to it.

"Production" should be the leading idea, and this can only be satisfactorily obtained by attending to all technical difficulties promptly, keeping every trade well supplied with material, etc., and also by avoiding delays caused by trivial discussions in regard to "Extra Works" or "Constructional Matters." Such delays cause less production, which means less profits, as "Establishment Charges" have to be met whether a contract proceeds with vim or otherwise.

Although a special chapter has been devoted to official administration (see page 103), it must not be concluded that the following notes and instructions regarding each trade have reference only to those matters which require attention on the job, as it will be obvious to the reader as he proceeds that they include items which usually arise in general administration, either at the office, job, or elsewhere.

An endeavour has been made to summarise them and place them in their proper rotation. At first it may appear more convenient to draw one's information from a given example, but the fact has to be taken into consideration that most buildings differ, both in size, design, construction, specification, and locality, and that it is, therefore, impossible to treat any one building as "typical."

CHAPTER VIII

CONCRETOR

ADVERTISE for labour if necessary. Send tools and plant to site (see list, page 293) and have any special wood templates that may be required made at joiner's shop and sent to the job in due course.

If it is necessary to break up stones, bats, or other material on the site, and the quantity of concreting warrants it, a crusher should be fixed and used for this purpose.

Send out enquiries for prices of stone ballast (to gauges required), cement or lime (see page 140), sand or gravel, and order them on as and when required. Ample provision should be made on the job for ensuring the cement being kept perfectly dry.

Gauge, mix, and make up concrete material on platform as near as possible to the spot on which it has to be deposited in order to avoid any unnecessary barrow work.

Make the materials work out as near as possible according to specification, avoid all waste in this direction.

Whilst this work is in progress no opportunity should be lost to make use of every fine moment. Trenches should be filled as soon as excavated, otherwise bad weather may set in and necessitate re-excavating on account of fallen earth.

It is the foreman's place to see that in the gauging of the material the Contractor's legitimate interests are not overlooked.

Concrete should be properly levelled off, otherwise unnecessary labour will have to be expended in cutting for the first course of footings to overcome the irregularity of concrete. It is not economical to employ too small a gang on concrete work. When concreting is done, serve local authorities with notice *re* inspection if necessary. With regard to the purchase of cement, it is well to have same weighed occasionally upon receipt from works. An under-weighted bag is not an unheard of thing. It often comes short-weighted through misunderstanding at works as some makers supply ten, eleven, or more bags to the ton, and it naturally follows

that this system of varying the weights of bags is often the cause of the mischief. Empty cement sacks should be bundled up as soon as convenient and returned to makers.

Reinforced Concrete, and Fireproof Floors, Sills, Lintels, etc.—Order stone ballast, and stone and granite chippings, or coke breeze (as specified), also cement, sand, ashes, iron joists, shaped or straight steel rods, rails, expanded metal, concrete hardener material or any waterproofing speciality if specified, also timber, stay or hanging irons, bolts, etc., for suspended centring shuttering and casing, also send to the job boxes or concrete-making machinery for concrete sills, heads, mullions, steps, transomes, jambs, etc., also oil (for coating the inside of the boxes), floating rules, straight edges, sieves, spots, etc. Hosepipes, sledge-hammers, rammers. Obtain rough boarding or dunnage boards for vault timbering, etc.

Before floating off any floors that have to be prepared to receive woodblocks, tiles, or other special materials, ascertain from Architect the exact thickness of such material, so that the floating can be brought up to the exact level required.

See Granolithic Work, page 139.

For Trade Memoranda, see page 279.

CHAPTER IX

DRAINER

ORDER stone ballast, ashes, lime or cement, etc., for concrete under pipes. Examine plant list (page 293) and send to the job all necessary plant required, such as picks, shovels, barrows, wheeling planks, drain-rods, smoke-test machinery, etc.

Order all pipes, bends, junctions, taps, gulleys, syphons, intercepters, half-pipes, etc., also inspection covers, stone curbs, step irons, etc., for manholes (see page 136 respecting orders for white glazed channelling). When ordering manhole covers in any quantity it is well to know that the Contractor can usually have his name and address cast on them for a very trifling extra charge.

The chief point to bear in mind when laying pipes is that the line they make when laid is a perfectly straight one, both as regards gradient and line of sight. This, of course, should be done by the use of sighting-rails and boring rods.

Should the drainage be extensive or present any special difficulty, it will sometimes be found advantageous to the Contractor to sublet it to an experienced drainer. There are numerous firms who specialise in this class of work. If it be sublet, it should be on the distinct understanding that the work is to be executed to the Architect's satisfaction before payment is made for same. The depth of the sewer should be ascertained before commencing draining operations, as both Architect's and Surveyor's plans are sometimes unreliable in regard to this.

If the Architect or Clerk of Works deems it advisable to leave any timbering in the drain, such timber should be measured up and charged for.

Give notice to Surveyor to inspect drain and have same connected to local sewer. Pay all fees connected therewith.

For Trade Memoranda, see page 279.

CHAPTER X

BRICKLAYER

OBTAIN all necessary tools and plant required, including :—

Centres.	Scaffold bars.
Cranes, etc.	Scaffold planks.
Fall ropes.	Scaffold poles.
Hods.	Scaffold ropes.
Ladders.	Or
Pulley blocks.	Steel lashings.
Putlogs.	Turning pieces.
Spots.	Wedges, etc. (see list, page 294).
Also engage all necessary labourers, scaffolders, bricklayers, etc.	

Should a large quantity of bricks be required for the job arrange the best and cheapest means for dealing with them. A brick crate, also winch with a double rope, etc., is very serviceable. If making your own mortar, order lump blue lias lime, and also get ashes to the site (soft and fine ashes for preference, as they require less grinding and are therefore more economical).

When the mortar pan is working constantly under pressure it is wise to take precautionary measures against wear and tear and possible breakdowns by keeping in stock a set of false bottom plates for the pan.

The mention of mortar suggests a very important point in regard to the attendance on bricklayers, masons, and plasterers. If the job is a big one where a lot of bricklayers, etc., are employed, it will be found an advantageous policy to pay a few of the labourers extra for starting work a little earlier in the morning than the tradesmen in order to get mortar, etc., on to the scaffolds ready for them to start work. A good percentage of time is often wasted early in the morning for want of material, and if an arrangement such as suggested can be made, experience will justify its introduction.

It sometimes happens that a Contractor finds it more convenient to purchase mortar than make it.

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Fall ropes.	Scaffold poles.
Hods.	Scaffold ropes.
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Pulley blocks.	Steel lashings.
Putlogs.	Turning pieces.
Spots.	Wedges, etc. (see list, page 294).
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When the mortar pan is working constantly under pressure it is wise to take precautionary measures against wear and tear and possible breakdowns by keeping in stock a set of false bottom plates for the pan.

The mention of mortar suggests a very important point in regard to the attendance on bricklayers, masons, and plasterers. If the job is a big one where a lot of bricklayers, etc., are employed, it will be found an advantageous policy to pay a few of the labourers extra for starting work a little earlier in the morning than the tradesmen in order to get mortar, etc., on to the scaffolds ready for them to start work. A good percentage of time is often wasted early in the morning for want of material, and if an arrangement such as suggested can be made, experience will justify its introduction.

It sometimes happens that a Contractor finds it more convenient to purchase mortar than make it.

This commodity is sold in various ways, viz. :—

Per Load.
„ Cubic yard.
„ Ton, etc.

It is therefore very easy to be misled in regard to the quantity expected. In the circumstances a clear understanding should be arrived at before ordering. The term “ Load ” should be properly defined, or if the mortar is purchased by the cubic yard, a “ yard ” mortar cart or its equivalent should be used in the transport of it (see page 280 with reference to the different quantities of mortar).

Order early all damp-course vents, grids, air bricks, castings, corbels, brackets, lintels, wall ties for cavity walls, etc.

Order necessary common bricks, but before doing so see that they work in with the facing bricks specified for the job. It will be found that common bricks often differ considerably in size. It is impossible to do a good job unless the common bricks are of precisely the same dimensions as the facing bricks.

Order pressed wire cut, or other facings as specified, also arch bricks or other “ moulded ” special bricks, including all necessary stops, mitres, etc. (see page 135 *re* ordering of bricks). During the progress of the work it is the foreman’s duty to see that all walls are well covered as a protection against inclement weather. A little attention in this direction is not wasted.

As already intimated it is important that all special bricks should be ordered as soon as possible after the contract has been signed, as it often happens that they have to be specially made, which sometimes takes a considerable time, and may cause a serious delay to the work.

When ordering glazed bricks it is well to satisfy oneself regarding the thickness, etc. They do not always work in properly with ordinary face bricks.

When ordering firebricks obtain the necessary fireclay required from the same source, this is essential to make a satisfactory and reliable job.

Plain and moulded terra-cotta work, copings, etc., should be ordered early in like manner to special bricks (see page 143).

Cement should be sent to the job for filling in purposes on all terra-cotta work; also the necessary dowels.

When cleaning down brickwork a little spirits of salts added to the water proves of great assistance.

Endeavour to build in all such articles as air bricks, steel sashes, etc., as the work proceeds, as by doing so a saving of labour is effected.

For Trade Memoranda, see page 279.

CHAPTER XI

MASON

ORDER walling stones, cement, or lime for mortar, etc., and obtain masons and labourers for laying same when ready. Get all plant required to the job (see page 294), also all templates, centres, turning pieces.

Obtain all particulars (fixing plan for preference) from Architect or Engineer of all openings and cutting required for heating and ventilation, and instruct foreman accordingly. This work should be attended to as the building is in progress to save expense.

Dressed stonework cannot profitably be carried out by small builders, but on large contracts it is certainly a paying proposition, and the most economical method, as a rule, is for the Contractor to convert the stone on the job, or as near same as possible. When this is done "lean-to sheds" should be erected for the banker hands in order that the work may be carried on in the dry. All necessary tools, saws, planing machines, hoisting cranes, etc., should be got in readiness. If, however, the dressed stone or artificial stone is obtained from stone merchants full details should be got out and quotations obtained, and the order placed at the earliest possible moment to avoid delay (see page 136). It should be stipulated when ordering that the whole be supplied to the "Architect's entire satisfaction." It should also be specially mentioned that the stone must be despatched to the job in the order desired by the Contractor. In placing an order for dressed stone the question of despatch often weighs more than that of price.

As a rule, steps and sills are wanted some little time before mullions, transomes, jambs, heads, and so forth. Therefore, the order should be worked and executed to suit the Contractor's need and not the convenience of the stone merchant, who has the execution of the order. The writer has known cases where stone had been sent to a job in practically the reverse order to the requirements of the Contractor, causing as a consequence unfortunate and expensive delays. Every

piece of worked stone sent to a job should be clearly and suitably "marked" ready for fixing in accordance with a prepared key or fixing plan which should show all the joints. A copy of this plan should be in the hands of the foreman by the time the stone arrives. The bathstone workers should be instructed to well smudge the stone with bathstone liquid (a mixture of bathstone dust and water) before despatching it to the job for fixing, as a general protection against damage before the final cleaning down process is attended to. Sufficient bathstone dust and cement should be sent to the job for jointing purposes. The proportion of cement should be about a handful to a bucket of dust. A point which should not be overlooked before ordering stone to be delivered on to the site is to arrange a definite position on which to place it. One from which it will not be required to be lifted or moved until it has to be fixed into position in the work. The stone store should be covered in as a protection from rain, frost, and material falling from scaffolds, etc. Another point to insist upon is the adequate protection to all dressed stonework after it has been fixed. Pilasters, cornices, and other projections should be well cased up (see page 136 *re* ordering of stone and other coping).

If there are any leaded lights to be fixed in the stone windows or other opening, such as church tracery, etc., brown paper templates should be cut from the stonemason's working templates, and put in safe custody in the office until such time as it is necessary to order the leaded lights. These templates, if carefully cut and checked at the time, should save a great deal of trouble later on. Experienced dressed-stone fixers should be advertised for when ready to start fixing. A supply of copper and slate dowels should be sent to the job, also a bottle of specially prepared shellac in order to make good any slight breakages of the stone in transit or fixing.

If possible, endeavour to get hold of a few good operatives for the cleaning down process.

Order padstones, copings, capstones, etc.

Rubble or Shoddy Work.—Some foremen exhibit a weakness in regard to this work by allowing their banker hands to spend considerably more time in the working up of the stone than is absolutely necessary to make a satisfactory job. This is one of the exceptional items on which the cost of labour if

not carefully supervised will soon prove unprofitable to the Contractor. It is, therefore, desirable, whenever a large quantity of shoddy work has to be executed, to impress on the foreman or leading hand the importance of avoiding any waste labour. The proportionate cost of the material to labour is usually very small, and it is therefore labour that has to receive the most careful consideration to obtain satisfactory results to the Contractor.

"Pointing."—This is work that should be given to experienced men. Fairly high prices should be charged for this class of work. Without taking into account the ordinary struck joint, etc., it is not every mason or bricklayer who can execute pointing with the neatness and necessary despatch to make it pay well.

The work can often be sublet to great advantage. If it is sublet the Contractor should make perfectly clear on his order (see page 142) the exact kind of pointing required, and also specify that it must be executed to the satisfaction of the Architect before final payment can be made for the work. In such cases the subcontractor finds tools. The Contractor usually supplies the cement, water, and necessary scaffolding for due performance of the work.

Paving.—Order on and lay the necessary "stone," "granolithic," or other paving specified, also curb and channelling for same (see page 142). The ashes, cement, and mortar will, of course, be on the site in readiness. In order to do a neat, satisfactory and profitable job, the paving should be obtained in specific gauges, such as 18" or 24" wherever possible. Apart from making a better finish to the job the labour in laying is considerably less than if the quarry is permitted to send on paving at random gauges. State when ordering paving whether "dressed" or "self-faced" paving is required. Before ordering care should be taken to ascertain that the paving specified complies with the local Surveyor's requirements. This is a point often overlooked by Architects. In the case of granolithic floors, order on granite chippings, cement, sand, etc., marble or marble substitutes.

Mosaic, Terrazzo, and Asphalt Work (see pages 135 and 141) should now have attention. Get the necessary material and plant sent on to the job in good time. This work is often executed by subcontractors selected by the Architect. When a Contractor places his order he should state that it must be

executed to the Architect's instructions and satisfaction and to the samples selected by him, thus relieving himself of all responsibility in the matter.

Ventilators (wall) should be ordered on and fixed in due course.

Pavement Lights.—If there are any required they should now be ordered. Correct sizes and full particulars should first be obtained from the Architect (see page 142).

The stone or wood rebated curbs will have already been ordered and fixed.

Clean down all stone dressings.

Foundation or Memorial Stone.—The stone should be of the best selected quality of its kind, and the lettering given to an experienced stonemason or monumental mason. All necessary bricks, stones, blocks, shear-legs, Lewis's, etc., should be sent to the job for the laying of same, as well as any platform or floor or roof covering specified for the ceremony (see page 137).

Order and fix chimney-pots, furnace pan, doors, and frames, fire-grates, stoves and stone mantelpieces, stone or slate hearths. When selecting grates, etc., the Contractor should ascertain if the prices quoted for the goods are subject to the customary builders' trade discount or otherwise. It is well to be quite clear on this point as often misunderstandings arise. If no "trade" discount has been allowed the Contractor should secure as favourable a "cash" discount as possible.

If more expensive and better class ironmongery, grates, mantels, etc., are selected by the Architect than those allowed for in his prime cost items the Contractor should claim an extra price for fixing them. As a rule, the more expensive the goods the greater the care and skill required in the fixing.

Carving and Sculpture (see page 136).—This should be put in hand sufficiently early to prevent any delay in removal of scaffolding.

During the process of dropping scaffolding the putlog holes are filled up, but often indifferently, and damp walls are the result, causing endless trouble to both owner and Contractor later on. Care should be taken to have the holes thoroughly filled up and cemented before finally leaving them.

For Trade Memoranda, see page 279.

CHAPTER XII

CARPENTER

ARRANGE for necessary labour and send plant to job. This should include:—

Floor-cramps.

Sawing tools.

Nail-boxes.

Candles.

Floor-dogs.

Floor-brads.

Spanners.

Hand-saws.

Augers.

Axes, etc. (see list, page 294).

Also a good supply of nails and screws.

Obtain details from Architect of all special carpentry work. If the contract is a large one, it may pay to fix up on the job a "General Joiner Machine," driven by power.

Order and on receipt fix all wall and sleeper plates, lintels, floor and ceiling joists, trimmers, herring-bone strutting, etc.

Prior to this a schedule of the exact requirements should be made out containing the number of pieces, lengths, sizes, and quality required, making due allowances for halving, jointing, and necessary cuts. It is not economical to make insufficient allowances, as waste on timber will result from same.

After completion of schedule an enquiry should be sent to a few timber merchants and the order given to the firm which can supply the nearest to the specification, provided, of course, that quality and prices are also favourable. It is a very prevalent (but unsound) policy to allow timber merchants to send to a job just what lengths of timber they happen to have in stock. Under such arrangements they naturally supply what suits their purpose best, and the result often means a big percentage of waste to the Contractor. Another practice in vogue with some merchants is that of systematically ex-

ceeding the quantity ordered, often to the extent of 25 per cent to 30 per cent, the usual excuse given being "allowance for waste." It should be made perfectly clear when an order is placed for deals, battens, boards, skirtings, mouldings, etc., that the quantity given is that which is expected to be delivered, and when any sharp practice is indulged in, as intimated above, it should be firmly and promptly dealt with and suppressed, as it simply means a loss to the Contractor, especially when the material is not of ordinary stock pattern (see page 141).

The joiner's foreman should be instructed that all joinery be clearly marked showing the place it has to be fixed (such as Room No. 6, first floor, etc.) before leaving the shop. This device saves time and mistakes.

The general foreman should prevent building timber being cut up for firewood or used for plant, which is often done when supervision is slack.

Iron roofs, traps, ventilators, vent tubing, ceiling plates, etc., should now be ordered from makers.

Order and on arrival fix the following roof timbers, etc. :—

Common and principal rafters, tie-beams, purlins, etc.

Ridge and hip pieces.

Valleys and gutter boards.

Gables and gable soffits.

Barge and fascia boards.

Skylight curbs and skylights.

Lead rolls, rough or wrot roof boards.

Tilting fillets.

Ceiling boards.

Roof felt and nails.

Vent tubing and roof ventilators.

Plumbers should immediately follow carpenters with flashings for roofwork. Order and fix floor boards, partition studs, dado and ceiling boards, etc. A good supply of floor brads and cut nails should be in readiness. Wrot boards should also be ordered well in advance of fixing period, in order to have an opportunity of seasoning them.

Order to the job all flat-boarded centring in one thickness, together with hangers and necessary struts required for any fireproof flooring construction required. It may be found convenient to use the centring for more than one floor.

When wrot boards cannot be obtained exactly to the lengths required, order them in long lengths or lengths that will cut into multiples. To make this clear we will assume that dado boards are required 4 ft. in length. Endeavour to obtain 8 ft., 12 ft., 16 ft., etc., so that they can be cut without waste. This principle applies more or less to the ordering of all timber.

Insert deal fixing slips, and plug walls, backings, grounds, etc., wherever necessary for securing skirtings, dadoes, door frames, overdoors, architraves, shelving, and other woodwork.

Fix centres and turning pieces for arches, case up girders and columns.

When fixing studding for partitions running the same way as joists and not self-supporting, two joists should be braced together underneath so that each will carry half the weight.

If allowable, have all joinery (that has to be painted) well knotted and primed before leaving the shop (especially if a little sap is visible). This will act as a protection against mortar and other extraneous material on the building. After delivery on site, all joinery should be immediately stored and protected from the weather. Floor boards should also be protected and stacked on the site with the faces downward.

Fix stairs, newels, handrails, balusters, spandrel framing, ceilings, trap-doors, etc. (See page 141 regarding the method of ordering of mouldings, skirtings, etc.)

Fix Sashes and Frames.—Before leaving the shop sashes should be weighed and a detailed list of sash-weights required made out. The sash-weights, together with necessary sash-cord, sash-lifts, sash-pulls, and other fittings, should then be sent on to the job forthwith. If iron tongues are specified they should be sent on to the job at the same time, “all ready cut to the lengths required.”

Fix skirting, architraves, dadoes, picture and chair rails, cap-pings, window boards, asbestos sheets, etc. Plug walls first and put in all necessary grounds.

Fix quoin beads, door frames, jamb linings, etc.

Provide butts and screws and fix all doors, etc., also provide and fix locks, finger-plates, escutcheons, bolts, latches, tee hinges, floor springs, padlocks, or any other ironmongery for same (see chapter on Ironmongery, page 66).

Fix cupboards, dressers, shelvings, etc., with necessary ironmongery.

A good supply of sawdust in sacks should be sent to the job

ready for laying on wood and other special flooring that is likely to suffer from plasterers' and painters' work that has subsequently to be executed.

Treads of stairs should also be protected with rough overboards.

Fix folding partitions (if any) (see page 137).

Blinds.—Inside and outside blinds should now be fixed. (For further particulars, see page 135.)

Cloak-room Fittings, see page 136.

Galvanized Wire Guards, see page 138.

For Trade Memoranda, see page 281.

CHAPTER XIII

JOINER

OBTAIN all necessary details from Architect. Joinery, like dressed stonework, is not always a profitable undertaking for small Building Contractors ; it is therefore often found more economical to sublet same. We will, however, for the present assume that the joinery is being made at the Contractor's shop and will be executed in such order as will best meet the requirements on the job. If a shortage of labour is experienced, the secretary of the local Carpenters' and Joiners' lodge should be approached and his services enlisted with a view to securing the best and most reliable shop hands that may be at his disposal. Some care and discretion is necessary in the selection of shop hands, if good results are looked for.

Under ordinary circumstances the foreman joiner will have full control of the yard, and, in order to secure satisfactory results, he will obtain the best workmen possible and also use every effort to produce a good understanding with them. Although strict, he will be scrupulously fair. By his tactful example he will endeavour to inculcate smartness, co-operation, etc., in all. He will try to obtain the best working conditions for them, cleanliness, etc., not being overlooked. The various stores will also come under his supervision.

One of the first steps to be taken, in order to secure a satisfactory output of joinery, is to keep an ample, well-selected, and assorted stock of timber always in hand (see page 129 for suggested list of general stock, and page 130 *re* hard woods). It should be stripped and stacked to season ready for use.

A detailed list of joinery required for the contract (see abridged example on page 59) should be handed out to the shop foreman. This list should contain full particulars of all that has to be executed.

Roof trusses, lantern lights, doors, frames, jamb-linings, sashes and frames, are usually put in hand first, then follow :—

Stairs, including newels, balusters, handrails, stair treads, etc.
Screens, sliding partition, barrowed lights.

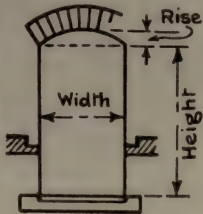
Counters, special shelving, wood mantelpieces.

Book-cases, cupboards, dressers (and other inside fittings too numerous to mention here).

SCHOOL DOOR LININGS

Position	Height Over all	Width Over all	Finished Lining Width	
Door to balcony .	9'11"	3'0"	1'3 $\frac{3}{8}$ "	Rebated for 1 $\frac{7}{8}$ " doors
Corridor to dining-room	9'11"	3'0"	1'3 $\frac{3}{8}$ "	
Waiting-room . .	7'1"	3'2"	10 $\frac{1}{8}$ "	
Teachers' room .	7'1"	3'2"	10 $\frac{1}{8}$ "	

SCHOOL SOLID FRAMES

No.	Height	Width	Reveal	Window Board	Rise	Position	
1	4'7" to springing	5'0"	2"	1 $\frac{1}{4}$ "	2 $\frac{1}{4}$ "	Class-room	
6	7'5" "	3'0"	2"	1 $\frac{1}{4}$ "	1 $\frac{5}{8}$ "	Cloaks	
6	7'6" "	3'0"	2"	1 $\frac{1}{4}$ "	1 $\frac{5}{8}$ "	Corridor	
1	6'4" "	7'0"	2"	1 $\frac{1}{4}$ "	7 $\frac{3}{4}$ "	Kitchen	
1	8'4" "	2'9"	2"	1 $\frac{1}{4}$ "	7 $\frac{3}{4}$ "	Pantry	

Joinery and roof timber should be cut into scantling sizes and put aside for a time for natural and gradual drying before being worked up. Bench work should be framed and morticed, put together without wedging, and placed in a suitable drying apartment before being finally glued and wedged up. The ideal method for general seasoning of timber is to stack same in the open air for about a year, and then finish same off in properly constructed drying sheds for a similar period. All boards should be stripped when stacked away.

There are many systems of artificial timber drying on the market which can be adopted by busy firms with great advantage.

If the joinery has to be purchased by the Contractor, enquiries should be sent out at a very early date after the signing of the contract to a few leading firms of local joinery manufacturers who hold a reputation for reliable workmanship and reasonable prices.

With this enquiry full particulars should be given of the various items. The Architect's specification, touching on the quality and seasoning of timber and quality of workmanship, should be followed as near as it is practicable to do so. Special mention should be made that the whole of the joinery must be supplied to "Architect's satisfaction." No manufacturer of standing will object to such a condition being laid upon him.

Joinery is one of those sections in building construction in which it is unwise at any time to sacrifice quality for cheapness.

All wrot pitchpine should be well sized before leaving the shop, as a protection until varnished.

If practicable, all joinery that has to be French polished, such as handrails, counters, panelling, etc., should first be bodied in at the shop. French polishing, oiling, or wax polishing should not be executed in a cold, damp, or dusty atmosphere.

If the French polishing is sublet, refer to page 142 as a guide to ordering same. Unless specified, brush polish should not be permitted. It should also be seen that all nail holes are properly filled in and that door edges, etc., are properly polished. They are sometimes sadly neglected.

Door, screen, and other panels should be completely polished before being fitted into the work for which they are intended, so that if any shrinkage occurs afterwards no unpolished parts will appear.

The following directions will no doubt be found useful to those who desire to fumigate oak or other hard woods to darker tones of colour and who have no actual experience of the work:—

- (a) Provide an air-tight chamber for stacking the work to be fumigated, leaving all and every surface to be coloured quite free for access of the fumes.
- (b) Provide means for observation of the process of fumigating to the required shade by leaving a glazed window in the fumigating chamber.
- (c) After carefully stacking the joinery, provide and distribute in the fumigating chamber two or three shallow tins or vessels about 18" × 12" × 2" deep, and in these vessels pour liquid ammonia of 880° strength, about $\frac{1}{2}$ " deep in the tins. Precaution must be taken that

the person filling these tins should be accompanied and the operation carried out expeditiously, in order that the fumes may not overcome the person filling the vessels.

- (d) After filling the vessels the door of the chamber should be sealed air-tight as quickly as possible and observation kept on the work, so that the door may be re-opened and the fumes allowed to escape directly the joinery in the chamber is the required shade.

It is difficult to give definite instructions, as the result of fumigating work is a question of experience and dependent upon the quantity of work to be fumed and to the quantity of ammonia to be used. Approximately half a gallon of ammonia would be sufficient to tone, say, 1000 ft. super of oak in one hour.

With regard to parquet and woodblock floors, these are usually sublet, either "labour only" or labour and materials. The notes on page 144 will be found ample for the ordering of same.

Whilst dealing with the subject of joinery it will not be amiss to remind those connected with factories and workshops that it is necessary, in order to comply with the Factory Acts, that all young persons under the age of sixteen be certified by the local Certifying Surgeon and the name entered in the General Register provided for the purpose. All accidents to employees should also be recorded in this register.

In large shops and mills the inconvenience and expense of removing chips, sawdust, and shavings by hand from the various woodworking machines and the risk of fire caused by their accumulation is great. To overcome this difficulty, automatic apparatus has been installed in many mills with exceedingly satisfactory results. There are various "conveyancer" systems, each claiming particular advantages. Amongst the most successful of these is the "Pneumatic," in which the rotary exhaustor draws the refuse direct from the machines, as it is being made, through suitable pipes, etc., and empties same either outside the building or into the boiler stokehole, as desired. Considerable experience is necessary in the designing and construction of these installations, in order to obtain the best results with the minimum expenditure of power and the least inconvenience to operators of the machines, both as

regards access to the cutters as well as actual working operations. The metal trunking is either carried overhead or underground ; the latter is preferable when possible, especially when there is a basement under the mill. The overhead system is usually adopted when there is no basement, as the pipes are more accessible than if placed in a trough and can be more easily arranged with the minimum number of bends, etc.

In order to have a constant supply of first-class joiners available many contractors make a speciality of joinery work for the trade. Where this system is adopted and estimates for joinery work are submitted, it is well to give all particulars of goods under offer, such as the number of articles, full particulars, sizes and dimensions, quality of timber, if painted or otherwise, whether delivered or carriage forward, also if nett or subject to a special discount ; also give approximate time for delivery. The omission of any such detail often leads to misunderstanding and trouble.

Protective clauses such as the following could with advantage be printed at the back or foot of the estimate :—

CONDITIONS OF SALE.

Due payment for past deliveries to be a condition precedent for future deliveries.

1. All quotations and agreements are subject to strikes, accidents, war and other causes beyond our control.
2. Buyer takes sole risk in transit, even when goods are sold carriage paid.
3. Goods quoted as carriage paid will be consigned at Owner's Risk rates, unless otherwise requested by buyer (before consignment) to consign same at Railway Company's risk, when the extra rate and charge for packing will be charged as extra to quoted prices.
4. Timber, Mouldings, Skirtings, and Matchboards will be subject to labour charges at the same rates as is usual with the timber merchants, and same will be added to quoted prices. Also the cost of cartage will be added to the charge.
5. Sizes quoted are nominal sizes (not finished sizes), allowances to be made for the working, unless otherwise stated.
6. Frames and Sashes quoted for at per foot super, will be charged for at a minimum measurement of 18 feet super for each Frame and Sash.

7. Single Casements and Frames (except for W.C. and Pantry) quoted at per foot super shall be charged for at a minimum measurement of 15 feet super for each.

8. All goods which are sold subject to Architects' approval to be inspected at the Works before being consigned, otherwise the responsibility shall be with the Buyer.

9. Foreign made Joinery and Doors are sold subject to any defect that may be found, and subject to usual labour and delivery charges.

10. Lump sum quotations and contracts. The goods shall be charged up in whole or portions as delivered, and paid for as per Clause 12. Goods framed up under Customer's instructions and awaiting forwarding orders to be charged up on account to the value of 75 per cent of the goods, and paid for as per Clause 12.

11. The Buyer shall be responsible for and satisfy himself as to the correctness of all working sizes, measurements, and descriptions.

12. When goods are sold subject to Cash Discount the same will only be allowed if paid within the month following the date in which the goods are despatched by the sellers.

13. All detailed Estimates to be accepted in whole and not in parts.

14. All quotations are given, *and orders are executed*, on the understanding that we reserve the right to increase the Contract Price by any additional sum which may be necessary to cover increased Railway Freights and Charges, increased cost of manufacture, due to increase in wages, increased cost of materials or reduction in working hours.

TIMBER

There are many pitfalls before a Contractor in purchasing his materials, but probably none greater than the obtaining of suitable timber. It is always advisable to inspect timber offered before purchasing, or, in any case, order same "subject to inspection," so as to make quite sure it is suitable for the particular purpose in view. For instance, a parcel of 3" x 9" unsorted Gothenburg Red may be offered, say, at £25 per standard, and also a parcel of unsorted Kemi at £30. If the deals are wanted for joists, the cheaper lot will do; but if for door frames, sills, window boards, it is more than likely

they will be unsuitable, whereas the higher priced goods will serve. The following few notes may act as a general guide.

Redwood (or Yellow, as it is called in London).—Goods shipped from the lower Swedish and Norwegian ports are inclined to be very sappy, and a very large proportion contain boxed hearts thus :



These goods are suitable for rough timbers, but not for joinery work, which should be made from wood shipped from the Upper Gulf ports, such as Gefle, Soderham, etc. The very best timber is that shipped from Russia, always remembering that Petrograd deals are one grade lower than Archangel quality ; thus a second Petrograd deal is about equal to a third Archangel.

American Redwood.—Quebec Red Pine and its near competitor Western Pine, although containing large knots, are well made, very free of shakes, and with selection make good "interior" joinery.

Spruce.—Usually suitable for timbering only, although the better Quebec variety are useful for stair treads, floorings, etc.

Quebec (Yellow) Pines are the soft wood par excellence for joinery, although, of course, they are expensive.

HARDWOODS

Mahogany.—Should always be selected. It is absolutely unsafe to buy from quotations. Good boards with splendid colour are obtained from African wood. Honduras wood, although lighter in colour, is excellent for all joinery work.

Oak.—Should be thoroughly dry, and although the writer would like to see more English (or native) wood used, there is often a great difficulty in getting it well seasoned.

Austrian wainscot oak is used for the very best work. Japanese or Siberian oak, although somewhat lacking in colour and grain, makes excellent joinery, as does northern white oak from the United States. Red oak is not suitable, generally speaking.

Teak.—The finest wood comes from Rangoon and Moulemein ; an inferior quality from Java. There are also sub-

stitutes, such as Eng and Yang, but although suitable for some purposes they have not the essential oils which render teak so valuable for outside purposes, etc. etc.

Canary Wood, so called, is really the yellow poplar, and is a splendid wood, as it can be polished to any colour. This wood comes in very wide widths, and is much used for signs, facias, etc.

There remains one other wood which perhaps is not really either a hard or soft wood. We refer to pitchpine—often used for church roofs, seating, etc. For the latter purpose the boards should be either cut from logs and stacked for drying, or kiln-dried boards should be used. A near neighbour to pitchpine, although lacking in resin, is Douglas fir, usually known as Columbian or Oregon pine. It is a splendid wood, and its better qualities are most useful for joinery, although it has not yet found general favour.

CHAPTER XIV

IRONMONGER

IF the selection of ironmongery rests with the Architect, he should be approached well in advance to ensure the order for the goods being put in hand early, so as to avoid any delay in delivery. Immediately the necessary supplies have been decided upon, a complete list should be made out, and the goods ordered forthwith. There is such a variety of ironmongery on the market, both as regards design and quality that it is impossible to enter into details here, but a few points can with advantage be brought to the notice of the reader.

In ordering locks and latches, state whether

Rim or mortice are required,
Right- or left-hands, or
Right- or left-hand reverse bolt.

If any locks are required to be "rebated" to suit folding doors, etc., a full-size section of door style should be given with order.

State if more than one key is required to each lock, also in the case of a number of the same locks being required, whether they are to "differ" or to "pass" or again to differ and to pass a "master key." If no instructions are given, makers generally assume that locks are required to differ only.

Often in the case of large public buildings the locks are divided into a number of suites, the locks for each particular block differing one from another and being governed by one key called a "sub-master" key, and again all the different blocks being subject to one key known as the "grand master" key.

It is always advisable when considering suiting of locks on anything like a large scale to consult the manufacturers.

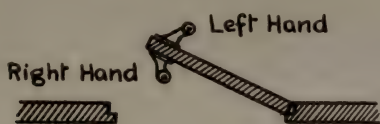
Give particulars at the same time of the furniture and finger-plates required, supplying in the case of the latter the width of the door stiles.

A point that should not be lost sight of when ordering furniture for doors "opening out," and where an upright lock is used (such as French doors), is that the handle to be fitted

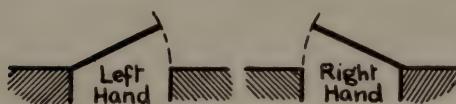
on the inside of the door must of necessity be of such a pattern as to be well clear of the jamb, otherwise when opening the door the user's hand is likely to suffer. A handle of the lever pattern is usual in such cases.

The material—brass, iron, bronze, or gun-metal—and any special finishing that may be specified, should be clearly stated.

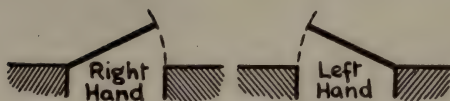
The following illustrates the trade method of arriving at the hands of the locks and latches:—



Handles and Lock Plates.



Hinges.



Outside of Doors



Outside of Doors

Latches and Locks.



Inside

Casement Bolts and Fasteners.

PARTICULARS OF IRONMONGERY

	Room	Windows	Length of Cords
BASEMENT	Front entrance . .	—	—
	Store Nos. 7 and 8 . .	10 fan openers . .	4 ft.
	" " " . .	—	—
	Bicycle room . .	2 brass sash fasteners .	—
	Heating chamber . .	1 fan opener . .	2 ft.
	Cloak drying room . .	1 " . .	4 ft.
GROUND FLOOR	Assistant teachers' room	5 fan openers . .	5 ft.
	" " " . .	5 sash fasteners . .	—
	Classrooms Nos. 1 to 4	24 fan openers . .	5 ft.
	Store No. 2 . .	—	—
	Waiting room . .	4 sash fasteners . .	—
	" " . .	4 fan openers . .	5 ft.
	Head teachers' room . .	4 sash fasteners . .	—
	" " " . .	4 fan openers . .	5 ft.
	Library room . .	12 " . .	5 ft.
	Changing room . .	2 " . .	4 ft.
	Games' room . .	2 " . .	4 ft.
	Girls' W.C.'s . .	10 " . .	5 ft.
	Cloaks . .	6 " . .	3 ft.
	Basement stairs . .	1 sash fastener . .	—
	Store No. 3 . .	1 " " . .	—
	Assembly Hall . .	10 fan openers . .	8 ft.
	Corridor to Assembly Hall	2 swing hinges . .	—
	" " " . .	2 pairs handles . .	—

Note.—When this list is complete it should agree in every

TO BE FIXED AT Highbury School

Doors	12" Fan Openers	Sash Fasteners	Mortice Locks and Furniture	6" Rim Locks	5" Swing Hinges	Door Handles
1 6" r.h. run lock . .	—	—	—	1	—	—
1 6" " " . .	10	—	—	1	—	—
1 6" l.h. " " . .	—	—	—	1	—	—
— . .	—	2	—	—	—	—
1 6" " " . .	1	—	—	1	—	—
1 6" " " . .	1	—	—	1	—	—
1 mortice lock and furniture	5	—	1	—	—	—
—	—	5	—	—	—	—
—	24	—	—	—	—	—
1 mortice lock and furniture	—	—	1	—	—	—
1 " " "	—	4	1	—	—	—
—	4	—	—	—	—	—
2 " " "	—	4	2	—	—	—
—	4	—	—	—	—	—
2 " " "	12	—	2	—	—	—
2 " " "	2	—	2	—	—	—
1 " " "	2	—	1	—	—	—
—	10	—	—	—	—	—
—	6	—	—	—	—	—
1 " " "	—	1	1	—	—	—
1 " " "	—	1	1	—	—	—
—	10	—	—	—	—	—
—	—	—	—	—	2	—
—	—	—	—	—	—	2
<i>Forward</i>	91	17	12	5	2	2

particular with the Ironmongery order placed with makers.

Fanlight Openers and Gearing.—Details required for ordering depend on the type to be used, but if the following particulars are complied with they will be found sufficient to meet most cases with regard to gearing :—

Number of lights to open.

How hung.

Size of lights.

Width of frames and mullions, and if recessed.

Height of transome from floor.

A further point that must not be overlooked when ordering is to mention that all screws necessary for fixing the various articles must be sent with them. This is very essential, as it is the practice of many makers not to include screws. This omission causes annoying and expensive delays, as it is very often not discovered until the carpenter is ready to fix them. It will be found more convenient in every way to obtain the screws as suggested, even though it may be cheaper to buy them in bulk.

When ironmongery arrives on a job it should be put in the foreman's office, or the driest place on the building, then checked and sorted out ready for fixing. The key of the room in which it is placed should be given into the custody of the carpenter, who should be held responsible for its contents. Nothing should be disturbed until the goods are required.

In order to avoid waste of time, confusion, and mistakes, a detailed list of the ironmongery ordered for the contract should be given to the foreman. This list should minutely describe where every article has to be fixed. The list on page 69 should be taken as an example.

If there are several large floors or separate blocks of buildings in the contract, it will be found an advantage to instruct the makers to pack the ironmongery for each floor or block in separate parcels with distinctive marks or numbers on them.

Hopper Cheeks.—State

Height of clear openings and full-size section of the mullion or jamb and sash.

Width of opening, if stiffening bars required.

Single pairs or if with mullion cheeks.

Steel Casements.—See page 136.

CHAPTER XV

SLATER AND ROOF TILER

THERE is now a large amount of subletting in vogue in connection with this work, and it is asserted with a good deal of truth that it can be done, as a rule, more economically that way than by an ordinary Contractor, as slating contractors buy in bulk and are in constant touch with the market and keep a reliable and expert staff of men always available, but to an experienced, energetic Contractor there is little or nothing to be gained by adopting the system in connection with his contract, i.e. if he has reliable slaters in his employ. If there is any advantage at all to a Contractor in subletting slating it is usually where some special kind of work is required to which local men are unaccustomed, such as a random sized rustic slate roof fixed in graduated courses, or a circular and exceptional roof, slates of exceptional tints and texture, asbestos cement tilings, etc. Some of the better known slating contractors are in an advantageous position for buying these unusual classes of slates, and have also gangs of workmen capable of fixing them, but for ordinary slating a Contractor can usually purchase the slates as cheaply and obtain local labour cheaper than slating contractors who have to send their men from a great distance and pay heavy travelling expenses.

Contractors having little experience in subletting should be careful not to be guided or satisfied by a quotation which gives a figure at so much per square and omits any mention of the charges for the various extras for cuttings, etc. It is on the latter items that the slating contractor more than compensates himself for his apparently low quotation.

When an enquiry is being sent out to subcontractors, one of the following courses should be adopted :—

- (a) Enclose a copy of the Architect's plans and full specifications and enquire for a lump sum price for the job, as specified and shown on plan, with a proviso that the quoted price must include for all labour and

material, also all cuttings necessary, and that the work is to be executed to the satisfaction of the Architect.

- (b) Enclose a copy of the plans and specification together with full schedule of the slating in the Bill of Quantities for the contract (that is, all measurements for double course at eaves, single and double cutting, bonding new slates to old, rake and circular cuttings) with a request for a separate price for each item, including labour and material. The subcontractor should also be asked if they are prepared to take quantities given as correct, waiving any claim to extra work unless specially ordered. It should also be clearly stated whether slater or plumber fixes the lead soakers.

Either of these courses guards against subsequent misunderstandings, which frequently arise in subletting work.

It should be made clear in the enquiry whether the contractor or the subcontractor supplies the scaffolding and unskilled labour.

The foregoing remarks refer equally to Brosely Roof Tiling, etc.

If the Contractor decides to do the slating himself he should have the slates, slate battens, slate drills, hammers, slate rips, scaffolding, ladders, etc. (see Plant List, page 294), delivered in good time and take steps to secure all necessary labour.

Slates will, of course, be stacked on their edges on the site in the most convenient position for easy handling.

A fair sample of the bulk of slates intended to be used for the work should be submitted to the Architect for his approval, and the order to the selected quarry or slate merchant should be given with the proviso that the slate supplied must be of the same quality, colour, etc., as their sample, and, further, that they must be supplied to the Architect's satisfaction. The slate merchant or quarry should be responsible for quality and suitability of slates.

With regard to asbestos cement slates, these are usually supplied cut and holed for laying diagonally.

All lead work must be completed before slating is commenced, in order to avoid plumbers working on the slates and causing damage.

The following list includes most of the material necessary for the work of

Slating :—

Slates and undereaves.

Slate nails and slate battens.

Zinc or lead soakers.

Roof boarding.

Ridge and hip cresting and finials, with all necessary intersections, mitres, and angle crests.

Hip irons and screws.

Quarry owners usually load 1260 slates for the long thousand (viz. 1200), thus allowing 60 slates over for breakages. This fact should be taken into consideration when comparing a "quarry's" quotation with a "slate merchant's" price.

Broseley Tiling (see also page 135).

Ordinary nibbed tiles of an approved tint.

Tile and half do.

Top course tiles.

Valley eaves and hip tiles and W.I. hip hooks.

Ridge tiles and finials as above.

Nails.

Battens.

Tilting fillets.

Soakers.

Cement.

Mortar for ridges.

Asbestos Slate Tiling (see also page 135).

Ordinary shaped tiles.

Half-shaped tiles.

Top course tiles.

Bottom course tiles.

Copper clamps or rivets.

Battens as above.

Leading makers of these tiles usually give full particulars and illustrations in their catalogues regarding the method of fixing, etc.

For Trade Memoranda, see page 282.

CHAPTER XVI

FLOOR AND WALL TILER

ARCHITECTS sometimes entrust the whole of the above work to some leading tile manufacturer who employs his own fixers. The Contractor in such cases has simply to place a formal order for the work to be done to the Architect's instructions and satisfaction. If, however, the matter is in the hands of the Contractor, he usually places an enquiry with a few reputable tile manufacturers for the best they can do in regard to planning designing, and quality of tiles at a given price per yard (the Contractor allowing himself ample margin for fixing and profit when stating his price). If a prime cost amount is given by the Architect this should be mentioned.

After tile-makers' prices and designs are obtained, they should be submitted to the Architect and the order placed with the approved firm. Arrangements should then be made for fixing them in due course.

Fixing.—Some contractors are fortunate enough to have sufficient work in hand to keep a few good fixers constantly employed. Others, however, have to resort to subletting the work. Where this is done the Contractor usually supplies all material and plant necessary, such as cement, sand, floating rules, straight edges, and scaffolding (see Plant List, page 294). On page 144 will be found particulars of an order for tile fixing, which covers the principal points to be dealt with when subletting.

If for the wall and other tiling special stops, angles, mitres, have to be made, the tiles should be ordered well in advance to give makers plenty of time to get them ready. They take several weeks to make, and often come out unsatisfactory from kiln necessitating remaking.

When ordering floor tiles do not omit to give the number of "cuts," or half tiles, required. Five per cent of the whole quantity required is the usual allowance made for ordinary work.

Slate Work.—Care should be taken when ordering slate work from slate merchants to give full particulars as to joints,

finished surfaces, and edges, holes, sinkings, etc. (see page 143). Also see that all necessary cement, dowels, screws, cramps, etc., are sent in readiness to the job.

Masons usually do the fixing of slate work.

On page 135 will be found notes for the ordering of black-board slate work for schools.

CHAPTER XVII

IRONFOUNDER AND SMITH

STEELWORK for bridges, roofs, sheds, staircases, doors, etc., and wrought-iron work for gates, railings, verandahs, porches, sashes, etc., is generally purchased from makers and merchants who specialise in that class of work, but general smithwork is often made at the Contractor's own smithy. For the purpose of this article, we will assume that all goods have to be procured from outside sources.

When sending out enquiries for constructional steelwork, or when ordering, give the following particulars :—

For joists and channels state depth, width, and weight per foot.

For tees state width of table, depth over all, and thickness.

For angles state depth of each leg and thickness, and

For plates state width and thickness.

If any portions have to be fitted send a detailed sketch or drawing. Give all necessary figures for connections and positions of holes other than for connections. As all connections are standardised it will not be necessary to detail them except in unusual cases.

It is very seldom that bars require to be "dead cut," i.e. cut within one-eighth or an inch. This should be made clear on enquiries as an extra is charged for so doing.

If steelwork requires to be painted, specify one coat of good red oxide paint at maker's works.

On page 285 a list of "New" and "Old" British Standard Sections of Rolled Steel Joists is given. Note that some of the sections in the "new" list are not yet readily obtainable, but rolls are being cut and will be mounted in the near future.

It is essential that orders for steelwork should be placed with makers as soon as practicable after the signing of the contract. If this is not done delays are bound to result.

Architect's plans very rarely give working figures, and the Contractor is left to fix these from the site, with the result that he is not able to get the steelwork in hand until he has

got the footings in, and if, as is frequently the case, the steelwork starts from foundation level, the work has to stand until the steelwork arrives.

This is one of the most frequent causes of delay, and every effort should be made to avoid it.

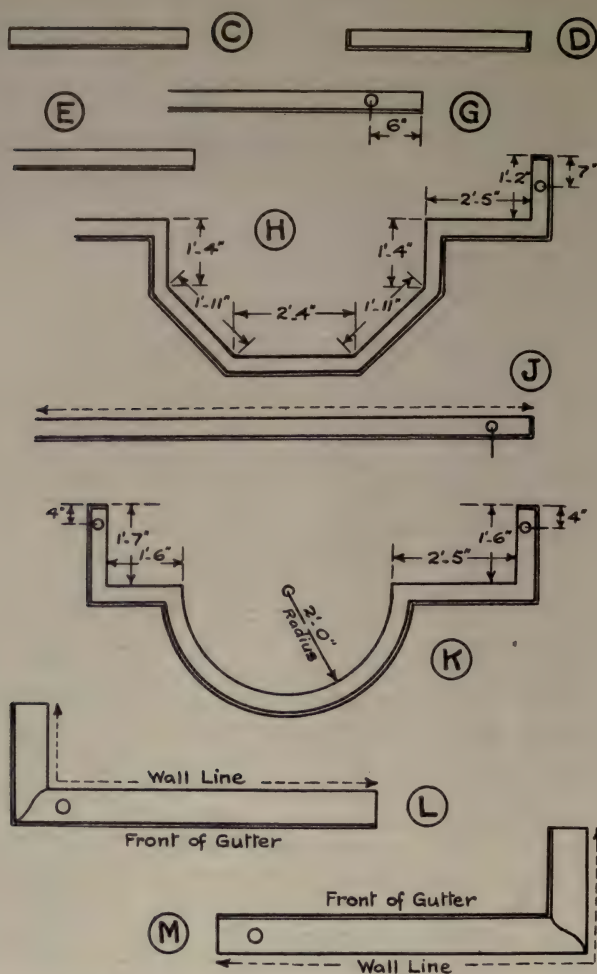
If the Contractor purposes to fix the steelwork himself, he should obtain plans from the manufacturers showing all the material marked for erection.

Any padstones or cover stones required should be ordered from quarry about the same time as the rolled steel joists are being dealt with, in order to be on the site in readiness for them.

Rainwater Goods.—See that Architect's specification is strictly adhered to. Measurements needed for the ordering of gutters and pipes should be taken on the job to avoid mistakes. It is preferable to order gutters from makers "laid to plan." They should be sent a clearly figured drawing, giving in detail the lengths of the various stretches, exact positions of the outlets, and including a list on same of the number of interior and exterior angles, right- and left-hand stop ends, and outlets (mention diameter of pipes for outlets) which the drawing is intended to show; this will avoid mistakes. Makers should be requested to suitably mark all goods ready for fixing, and submit a fixing or key plan for the Contractor's foreman's use. There is usually an extra charge of 5 per cent for supplying gutters and connections laid to plan, but it amply repays a Contractor where the guttering is of anything like an intricate nature, or where there may be more than one thickness of metal for the same size and section gutter ordered. It further simplifies matters greatly when breakages occur during transit, as owing to each gutter being numbered the makers can be immediately advised of the particular lengths or connections that require replacing. When placing order for gutters state whether stop ends have to be loose or cast on.

The directions on page 78 should be closely observed when ordering rainwater gutters ready for fitting up.

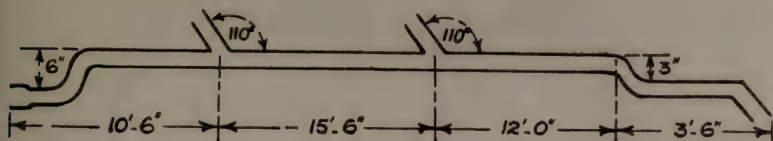
Pipes.—Give numbers and diameter, thickness of metal; state if round, square, or rectangular, also if single or double socketed, and mention if eared or otherwise. Order at the same time all necessary connections, viz. heads, shoes, offsets, swan-necks, etc. Give particulars of projections for all offsets



- (a) State Catalogue No. of gutter, also the size of same, or give full-size sections if there are more sizes than one of that No.
- (b) Show *front* of gutter by double lines (see Fig. C).
- (c) Show *stop end* by single line drawn across the end (see Fig. D).
- (d) Show *return end* by double lines drawn across the end (see Fig. E).
- (e) Show *open end* by omitting any line across the end (see Fig. E).
- (f) Any angles required otherwise than at *right angles*, state the number of degrees, thus, 45° or 60°, or give template, or lines illustrating exactly what is required.
- (g) Give position and size of outlet (see Fig. G), and should there be a projecting cornice on wall the projection and depth should be given so that inset may be made to suit.

and swan-necks. Vent and soil pipes should be ordered with large sockets for caulking.

When pipes are required ready for fitting, before being despatched from works detailed particulars should be given as per example below, showing positions of connections, also giving number and size of pipes and if with ears cast on or loose, etc. This will greatly facilitate matters and avoid unnecessary correspondence.



1 Stalk No. 1 Pipes 4", with No. 2 ears, No. 1 Spikes, Inset, offset, Branch pipes and shoes as sketch.

The gutters and pipes should receive one coat of paint before leaving works. The second coat is usually given on the ground on site before fixing, and the remaining coats when they are fixed in position.

The gutter brackets, bolts and nuts, pipe nails, and hooks, or holder bats, red and white lead for jointings, etc., should be sent to the job as soon as makers advise the gutters, etc., have been despatched.

Iron Stove Piping or Tubing (see page 140).

When ordering galvanised sheets do not overlook the ridging, also secure the necessary galvanised roofing screws, bolts, and washers for fixing them.

Gates and Railings.—General remarks as regards figured drawings, painting, etc., are applicable here. When ordering do not omit gate stops, gate pillars, locks, padlocks, and keys, hooks and hangers. If stone or iron pillar guards are specified, they should be ordered about the same time (see page 142). The fixing of gates and railings should be placed in the hands of the nearest available general smith who specialises in that class of work. All smiths are not capable of executing this work economically or satisfactorily.

The following general smithwork should be put in hand as required :—

Steel rods, specially prepared for reinforced concrete.
Chimney bars.

Roof straps, rods and bolts, gibs and cotters, etc.

Gratings.

Air gratings and skylights.

Iron and steel sashes and wrot casements.

Window guards and general art metalwork.

All to be painted one coat before delivery.

Also order :—

Coal plates.

Man-hole covers (state if with locks and keys) (see p. 140).

School and church bells.

Cellar doors.

Column caps and bases (see page 136).

Corrugated galvanised sheets.

Bolts, nuts, and cone-headed screws for same.

When ordering bolts it is well to be perfectly clear in your description and sizes, in order to avoid misunderstanding, e.g. 24 sq. rd. sq. $\frac{1}{2}$ " diameter bolts and nuts, 6" between head and nut (see page 286).

48 round washers for ditto.

Steel Casements and Sashes (see pages 136) :—

Lifts and elevators.

Metal balustrading.

Etc.

For Trade Memoranda, see page 284.

CHAPTER XVIII

PLASTERER

It is presumed that the Contractor employs his own plasterers. Should, however, it be found advisable to sublet the labour, an enquiry should be sent to a few reliable local plastering contractors, giving a detailed schedule and specification of the work. Inform them that you require price for "labour only," and that material and scaffolding necessary for the due execution of the work will be found by the Contractor. A priced schedule should be asked for, as this can be used as a basis for any extra work that may subsequently be done.

It is essential that all plant, such as Derby's sieves, cornice moulds, floating rules, straight edges, hods, spots, scaffolding, etc., and material, such as mortar for roughing in, lime, putty, cement, sand, plaster, laths, lath nails, stone or granite chippings for rough cast, etc., be on site in readiness.

Tubes for electric wires, gas-pipes, etc., should be run in position some time before the last coat of plastering is laid to avoid cutting, therefore arrangements should be made for this well in advance. Details of all cornices, mouldings, quoins, skirtings, arch panels, plaster friezes, enrichments, and other decorative plaster work should be obtained from the Architect at an early stage. Fibrous plaster decorations and such-like are usually carried out by specialists under Architect's instructions. It should also be ascertained from him whether any portion of the plastering has to be finished off in any special colour or tint, so that preparation can be made for it when preparing the skinning coat. Also learn whether outside or inside cementing has to be marked in any special manner, such as to imitate ashlar work, etc. The general foreman should see that the walls are built as nearly plumb as possible, then, when the plasterers start operations, the grounds can easily be fixed true and properly splayed to receive and form a key to the plastering, ensuring satisfactory work being done.

All floors should be covered with sawdust or some other suitable stuff before the inside plastering is started, as a protection against black mortar and other material. Chalk or

white lime and sand or other material should be ordered early. The white lime skimming ("putty" or "coarse stuff," as it is sometimes called) for the finishing coat should be run at least six weeks before use, in order that it may get properly set. Skimming material that has not had ample time to mature sometimes gives bad and often surprising results, and becomes a source of trouble to the Contractor before his maintenance period expires.

The putty bay should be well cleaned before use. When the white lime and sand is being placed in it, it should be seen that no extraneous matter is allowed to enter, and also that the lime used for the purpose of making ordinary mortar does not come in contact with it in any way, otherwise the work will almost certainly be affected later on with "blister" trouble or some other affliction. Whilst not advocating an oppressive or coercive manner towards workmen, it is well, if there are a number of plasterers on the job and several rooms of similar dimensions to be plastered, that they should be divided among the various rooms, in order to create a lively competitive spirit in their operations. The follow-on system does not always tend to good results. This remark applies also to other trades.

Care should be taken to order the plasterers' laths to the exact lengths required for fixing to studding, etc. It often occurs that laths are sent to a job without the least thought as to their adaptability with regard to length, with the result that a big percentage becomes waste.

Any fireproof partitions or ceiling material should be ordered well in advance, in order to avoid delay (see page 137).

Return all empty cement and plaster sacks to makers when convenient.

For Trade Memoranda, see page 287.

CHAPTER XIX

PLUMBER AND GASFITTER—ELECTRIC LIGHTING AND HEATING

THESE are branches of the building trade which deserve our closest attention. The work especially of gasfitting and electric lighting is often sublet, sometimes "labour only," and at other times "labour and materials." If it has been decided to sublet the work, an enquiry should be sent out (see page 142) to a few reputable local master plumbers and electricians, giving details of Architect's specification and quantities for same. If the difference in estimates received is not great, the work should be placed with the firm who can ensure the best workmanship and despatch. Inferior workmanship in these branches of the business is productive of more trouble, expense, and annoyance than any other, especially during the "maintenance" period. Should a lump sum estimate be received a priced schedule should be demanded before placing the order, so that same may form a basis for any additions or variations that may be made during the progress of the work. This is essential.

All necessary notices for connection to the main of either gas, water, or electric supply should be given in good time; also notices for the fixing or removal of temporary meters, etc. The laying of temporary water service mentioned on page 38 is usually the first item which introduces the plumber to the job. The lead pipe for this should be sent on in good time.

Some of the chief points to be observed in regard to plumbing are :—

- (a) That all holes and chases should, wherever possible, be left as the walls are being built and should be of ample size, as the average plumber requires plenty of elbow-room.
- (b) That the outside work on a building should be got ahead well in advance of the slaters and tilers. When these trades have completed their work, it will simply be a matter of the plumber dressing down flashings, etc.

- (c) All internal pipes, electric wires, tubes, etc., should be run in position some time before the last coat of plastering is laid on, and afterwards permanently fixed on the face of the final coat.
- (d) Good sanitation must not be sacrificed for good appearance under any pretext.

If the Contractor executes the work, send the following tools and material to the job, if necessary :—

- (a) Metal-pot, solder, benzoline or petrol, blow-lamp, soldering irons, and general plumbers' tools (see page 295).
- (b) Sheet-lead for flats (see page 140) and gutters, cesspools, domers, soakers, flashings, hips, ridges, etc., also copper tacks, wood rolls for flats, solder, etc.
- (c) Lead pipe for hot and cold water services, waste pipes, overflows, etc.
- (d) R.W. goods, which are now usually fixed by plumber, should be ordered early to avoid delay (see page 77, *re* ordering instructions).
- (e) Red and white lead, putty for jointing, R.W. goods, gutter brackets, bolts, pipe nails, stays, etc.
- (f) Also send taps, lead traps, sinks and draining boards, bath and accessories, w.c. cisterns, chain pulls and brackets, pedestals and seats, latrines, etc., copper ball cages for vent pipes, soil and vent pipes and connections, mica flap vents, galvanised cisterns, copper or iron boilers and cylinders (see page 136), roof vents, tallboys, copper sparge pipes, and connections, etc.

Arrange with the Architect to select sanitary fittings, gas or electric lighting and heating fittings, i.e. if prime cost items are provided for them, otherwise submit particulars and designs for his approval, and order upon receipt of instructions, giving full details and positions of all bells, lamps, wiring, batteries, indicators, switches, blocks, meters, etc. (see page 137).

Electrical work is usually governed by a prime cost item, and as good all-round workmanship and material is most essential, the Architect's instructions (1) and specification (2) and detailed fixing plan (3) should be embodied in any order given by the Contractor.

A Contractor should thoroughly satisfy himself that all lead is properly accounted for. He may, for instance, send a couple

of rolls of sheet lead, about a ton in all, to a job and for which only 17 cwt. has been allowed in the quantities. If the lead proves barely sufficient or insufficient to execute the work, there is certainly cause for enquiry. Either

- (1) The quantities are insufficient,
- (2) Extra work has been done and not accounted for, or
- (3) Lead has been removed from the job.

Each or all of these, as well as other causes, may explain away such a shortage. The foreman or plumber should keep a record of all lead cut on the job, on the same lines as example on pages 86 and 87. This will serve the double purpose of checking the quantities and cost of laying the lead.

The remarks regarding sheet lead also apply to lead piping.

Lightning Conductors, see page 140.

For Trade Memoranda, see page 288.

SHEET-LEAD

		4 lbs.		5 lbs.		6 lbs.		7 lbs.	
		ft. in.		ft. in.		ft. in.		ft. in.	
		Super							
Valley gutters	.	4	6'0"×1'6"						
	.	2	5'0"×1'6"			36	0		
	.	1	2'0"×1'6"			15	0		
Soakers	.					3	0		
	.	6	1'2"×8"						
	.	6	1'4"×8"						
	.	8	1'2½"×7"						
	.	12	1'2½"×8"						
Cover flashings and aprons	.								
	.	45	ft. run×7"			26	3		
	.	1	2'0"×8"			1	4		
	.	1	2'0"×7"			1	2		
	.	1	2'3"×9"			1	8½		
Step flashings	.	10	11"×8"×5½"						
	.	6	10½"×8"×5"					2	9½
Aprons	.							1	5½
	.	2	2'4"×10"			3	10½		

LEAD PIPE

PARTICULARS		$\frac{1}{2}" \times 6$ lbs.	$\frac{3}{4}" \times 9$ lbs.	$1" \times 12$ lbs.	$1\frac{1}{4}" \times 15$ lbs.	$1\frac{1}{2}" \times 19$ lbs.
		Feet.	Feet.	Feet.	Feet.	Feet.
Hot supply to bath	.	—	60	—	—	—
" " lavatory	.	9	—	—	—	—
" " scullery	.	32	—	—	—	—
Cold supply to scullery	.	36	—	—	—	—
Supply from tank to cylinder	.	—	—	31	—	—
Exhaust from cylinder to tank	.	—	—	31	—	—
Cold supply from stop-tap to bath	.	—	72 $\frac{1}{2}$	—	—	—
" " branch to feed tank	.	—	16 $\frac{1}{2}$	—	—	—
" " from main to stop-cock in cellar	.	—	9	—	—	—
" " to outside w.c.	.	—	32 $\frac{1}{2}$	—	—	—
" " to upstairs w.c.	.	14	—	—	—	—
" " lavatory	.	10	—	—	—	—
" " outside urinal	.	20	—	—	—	—
" " outside w.c. branch	.	1 $\frac{1}{2}$	—	—	—	—
Overflow from feed cistern	.	—	6	—	—	—
" " outside w.c. cistern	.	2	—	—	—	—
" " upstairs	.	3	—	—	—	—
Waste and overflow from upstairs lavatory	.	—	—	—	7	—
" " bath	.	—	—	—	—	5
" " scullery sink	.	—	—	—	—	3
Total lengths lineal		127 $\frac{1}{2}$	196 $\frac{1}{2}$	62	7	8

CHAPTER XX

PAINTER

THE painter is, as a rule, the last tradesman employed on a contract, and as he puts the finishing touches to all preceding work it should be seen that the operations are well finished and reflect credit on the whole.

Contractors usually employ their own painters, but where it is intended to sublet the work a full schedule, with Architect's conditions, should be given with the enquiry for estimates for the work, which should only be sent to a few reliable firms who specialise in contract work for the trade. The usual proviso that the work has to be done to the Architect's satisfaction should not be omitted (see page 141).

If the Contractor undertakes the work, all necessary labour should be obtained in due course, and all scaffolding, ladders, trestles, planks, steps, brushes, paddles, paint kettles, buckets, blowlamps, etc. (see list, page 295). Further, every class of material needed should be in evidence, such as knotting, plaster for stopping, colour paint, linseed oil, turpentine or turps. substitute, stainers (wood preservatives, if needed) and driers, glass-paper, size, varnish, etc. If any of the well-known special ready-mixed paints are specified, they should be ordered well in advance, to avoid delay. These materials should be stored in a dry, well-ventilated, and lighted room, preferably with a water supply handy. A striking feature of late years is the increase in the use of ready mixed paint and distemper. There is no doubt that a great saving of time and labour is effected by this method, and very creditable work can be turned out with the leading brands now on the market. A special point is that colours can always be matched. Arrange with the Architect to decide on the finishing colours and tints for all inside and outside work well in advance. Endeavour to get confirmation for same by letter, to avoid any question that may arise at a later period.

To keep painters as regularly and constantly employed as it is possible on any job, advantage should be taken of all fine weather for executing the outside work, leaving the inside work

to be done when the weather is indifferent or wet. This point should not be lost sight of, for though it seems the most natural course for workmen to adopt, yet experience proves that climatic conditions do not enter into the calculations of most foremen or workmen unless the matter is very forcibly brought to their notice. Dust in any form should be studiously avoided when wet paint is about. No traffic should be allowed in rooms which are in the hands of painters. Should different tints be required for each coat of paint, too marked a difference between each must be avoided, otherwise the possibility may arise of one coat not covering the other. To prevent such an occurrence the last coat of paint should never be a thin one.

Graining, writing or lettering, and gilding are generally let to specialists. It is usual to put the work out for competition amongst a few firms in that particular branch of the trade (see page 140).

Care should be taken at completion of work to collect all trestles, paint pots, brushes, etc., and return them to headquarters. Brushes after use should be cleaned and put into water to preserve them. If not attended to at once they will become practically useless. Surplus paint should also be properly keged up for future use.

A great deal of waste can be avoided, both on the job and at painters' shop in yard, in the mixing up of colours. Some workmen have so little sense of economy that they mix up a full pot of paint when a quarter of that quantity would be ample. Others religiously leave the lids off every keg of paint they chance to open; others never think of keeping the white lead or water paints covered with water to prevent hardening and, of course, spoiling, or even see that the glazing putty has sufficient linseed oil mixed with it, also to prevent hardening. Again, others never dream of cleaning their tools, strainers, or funnels after use, so that the general impression given is one of waste and chaos.

Oils are usually sold by the gallon. When same is supplied in barrels, the capacity is calculated on the weight. For example: A cask of linseed oil weighing 3-1-5 nett equals 41 gallons (based on the standard weight of 9 lbs. to the gallon).

With regard to white lead, for general purposes it pays in the end to stock the best warranted genuine English quality

(old slack process), which should be placed into a slate tank and covered with water, to prevent hardening and eventually becoming useless. There are various "reduced" grades of white lead on the market, which are used chiefly on the cheaper class work.

For Trade Memoranda, see page 290.

CHAPTER XXI

GLAZIER

IN a Contractor's business, where there is a constant run of glazing work on hand, it is advisable to keep a few crates of 15 and 21 oz., 3rd or 4th quality, clear sheet-glass always in stock ; but for specific contracts it is far more economical and less troublesome to have all or most of the glass required sent direct from manufacturers or merchants to the jobs " ready cut to size." The manufacturer's charge (over and above stock list prices) for cutting glass to sizes is usually very small.

Before ordering in this way, care should be taken that all sizes are thoroughly checked. The following is a short list of various kinds of glass manufactured :—

Plate-glass.

Patent plate.

Sheet-glass: Ground, fluted, silvered, coloured, enamelled, muffled, opal, ambetti, etc.

Rough cast and rolled plate.

Wired rolled, cast and polished plate.

Figured, rolled, cathedral, Flemish, and Muranese.

Maximum prismatic.

Rough chequered, etc.

In ordering some of these it is essential to mention which sizes are the heights and widths, and also, in the case of shaped panes, which are the outside or inside faces. The reason for this precaution is obvious ; for instance, in the case of rough-rolled glass, the ribs should run perpendicular and be on the outside face (see page 138).

See that sufficient putty, sprigs, etc., are sent to the job.

Wood sashes are usually sprigged when being glazed, but for iron sashes wooden pegs are inserted. All sashes, etc., that can be glazed on the ground before being fixed should be dealt with in that way.

Glazing is often sublet, and on page 139 will be found necessary details to cover the ground sufficiently for any enquiry or order.

Plate-glass requires to be very carefully ordered. It also requires careful handling when being fixed. When ordering bent plate of any description, too much care cannot be taken over the matter. A clearly marked wooden template should be sent to the glass manufacturers ; carefully cut or marked paper templates will suffice for ordinary shaped and bevelled plate, embossing, or brilliant cutting. In regard to the fixing of extra large size or special shaped plate-glass, such as for shop fronts, etc., it is essential to have only thoroughly experienced and competent men in charge of the work. They should be provided with ample assistance. Care should be taken that the glass when fixed shall not press too tightly against the frame at any one point, otherwise there is every likelihood of the glass becoming flawed at some position. To secure plate-glass orders some glass merchants in the big centres undertake to fix same at a very trifling cost over manufacturers' scheduled prices. These merchants, as a rule, employ a staff of very capable men, and it is very obvious that under arrangements with them the Contractor is relieved of all the anxiety and attendant risks of such transactions and is often well advised to take advantage of such services when available.

Should the Contractor attend to the fixing of plate-glass himself, he should first make arrangements with the railway company delivering the glass to have same brought to the job at a time when he can arrange to have a responsible staff of men on the spot to assist. The crates should immediately be examined to ascertain if any breakage has occurred "in transit." An arrangement should then be made with the carter to return later to take back the empty crate. These crates are, as a rule, of abnormal proportions, and it is advisable to remove them at the earliest opportunity, otherwise they become a nuisance and a hindrance to the general work.

Plate-glass should be insured with a first-class office immediately it has been fixed. The policy should hold good until such time as the building is finally handed over to the Building Owner. Insurance companies do not look very favourably on such risks. This, however, provides a very good reason for contractors covering themselves in that respect.

Lead-lights.—There is usually a prime cost amount inserted in quantities for this work. Should the Architect give the Contractor the option of securing a suitable design, etc.,

from a few of the leading makers, it is customary to ask them to reserve a trade or cash discount for the Contractor. If the lead comes of the lights are not reinforced with steel bars makers should be asked to include in their prices for all necessary saddle bars. This is an item too often overlooked by both Architect and leaded light makers, the Contractor often becoming the sufferer for such oversight.

When ordering lead lights (see page 140) it is customary to give the "sight sizes" and to state the allowance makers must provide in addition for rebates. Full-size templates of all shaped lights should be sent with order. In the case of church tracery windows it is advisable to have the templates made from the stonemason's setting out, as mentioned on page 51. It is a costly operation as well as unsatisfactory to take templates after stonework has been fixed. All orders for lead-light work *should be placed with the customary condition as to Architect's satisfaction*. In conclusion, it should be stated that glass manufacturers will, as a rule, forward a sample box of the various kinds of glass which they manufacture. These samples are often found very useful for reference, and should be in the possession of all contractors.

If any wire guards have to be fixed to windows they should be on the job in readiness as soon as the glazing has been executed (see page 138, *re* the ordering of wire-guards).

Patent Glazing.—This is also generally dealt with as a prime cost item, but if the Contractor has a free hand he should put a few good sound makers into competition. He should state on his enquiry whether the quotation has to include for materials only or materials and fixing, not overlooking the lead-work in connection therewith. A figured plan and section of the roof that has to be covered should be sent with the enquiry, also a full-sized section of the bar required, stating width of centres and whether wired or plain rolled or cast plate-glass has to be supplied, also furnishing details of any openings for skylights, etc. A watertight job must be guaranteed, and also all done to the Architect's satisfaction. When the order has been placed a note should be made to advise makers in due course of the date to send off the bars, glass, and fixers. The guarantee should be made to hold good to the full extent of the "maintenance period" under the contract, as it often occurs that, owing to glass being fixed too tightly at the angles, flaws appear at the least pressure or

settlement of the roof generally, and the liability for this the Contractor must guard against. He should also protect himself as regards compensation for accidents to glaziers and fixers (see page 141).

For Trade Memoranda, see page 291.

Paperhanger.—Send to the job in good time all steps, pasteboards, trestles, dust sheets, etc. (see list, page 295), also flour, size, whiting, plaster, pumice stone, washing powder, etc.

Wall-paper, ceiling and lining paper, borders, friezes, dadoes, lincrusta, or other specialities specified should also be delivered in time to make energetic and satisfactory progress with the work.

Work of this description is sometimes sublet with the usual stipulation that it must be done to Architect's satisfaction.

Chimney sweeping or similar dirty operations should be executed well in advance of any paper-hanging operations, so that all dust, etc., may be avoided.

For Trade Memoranda, see page 292.

CHAPTER XXII

SUNDRY ITEMS AT COMPLETION STAGE OF CONTRACT AND DAMAGES ON CONTRACTS

Wash Floors and Clean Windows.—Female labour is generally obtained for this class of work. Sometimes it is done on a daywork basis, sometimes piecework, the Contractor often supplying the sweeping and scrub brushes, buckets, soda, bar-soap, etc. Arrangements should be made to have warm water for the floors. Suitable ladders, cloths, trestles, etc., should be provided for the cleaning of windows, etc.

It is often more economical for the Contractor to sublet window cleaning. A copy of an enquiry for such work will be found on page 144, indicating the usual conditions governing same.

A few local window cleaners should be put into competition.

The general foreman should supervise the work when put in hand, as professional window cleaners often scamp their work, and unless a sharp look out is kept, the cleaning may have to be done again, and possibly at the Contractor's own cost.

Landscape Gardening—Sometimes, in the case of country houses, etc., this work is included in the building contract, and is usually provided for by a prime cost item.

Send in notice of completion to local Surveyor.

Completion of Work.—Some understanding should be arrived at when the building shall be deemed to be completed, such as :—

- (a) Notice from the Contractor or Architect that the building is completed.
- (b) Date when occupation commenced.

The authority of an Architect to decide on any delay of the contract work should be qualified, so that the Contractor may have the right to appeal to arbitration in the event of disagreement.

On completion of the work a letter should also be sent to the Architect suggesting that the permanent insurance of

the building should be taken up by the Building Owner. It should be pointed out that Contractor's policy only holds good during erection. Also when advising Architect that the building has been completed a request should be made for the immediate issue of a certificate due to the Contractor. This certificate should include half the retention amount, that is if the Contractor is entitled to same under his contract. A rough statement of account giving a few of the leading extras should also be enclosed with this request. If this letter receives no immediate response it should be followed up within reasonable time. Some architects are rather backward in issuing certificates at any time, but at this juncture they become specially dilatory, with the result that the Contractor has to be very diplomatic and use great tact to get them to give the matter anything like reasonable attention.

A rejoinder often comes from the Architect (in response to the Contractor's request for a certificate) in the form of a long list of items which he has discovered require attention, and which he insists upon being attended to before he can admit the fact of completion or comply with the demand for a certificate, overlooking or ignoring the period of maintenance which provides for such contingencies.

Liability for Repairs after Completion.—The liability of the Contractor should be limited to defects arising from bad workmanship or the use of materials other than those specified, and to defaults arising out of the works executed under the contract. It should also be held that the Contractor be liable only for the defective work of a subcontractor nominated by himself.

Generally speaking, architects are not unreasonable. It is therefore wise to attend to their complaints with promptitude.

When the certificate eventually comes to hand a note should then be made in the office diary of the date when the final certificate falls due, which is usually three to six months after the issue of the certificate just mentioned.

The Architect should be approached in respect of the final certificate a couple of weeks before the actual due date, to enable him to survey the building and give the Contractor ample time to put in order any further defects that may make their appearance.

Sometimes during the process of a contract difficulty arises with the Building Owner in regard to payment of certificates.

The course open to the Contractor is clearly defined in the usual contract form, and if the Contractor entertains any doubt regarding the financial status of his client he should act without delay on the lines clearly laid down there for him when any default occurs.

If the matter takes a serious turn the Contractor will naturally eliminate his risks to the lowest point by cancelling all orders on hand for the work, reducing the labour connected with the contract to a minimum, and seeking legal guidance, etc.

Notices should now be given to remove all temporary water- and gas-meters. Where the last water account rendered has been paid, obtain a refund of amount usually placed on deposit.

All tools, plant, etc., should be returned to headquarters, or sent to some other contract where they have need of them. It sometimes happens that the Contractor has tendered for some other work in the vicinity, and that it is desirable to delay the removal of the plant pending the result of such tender. The privilege of leaving plant on the site for a few weeks can usually be obtained, and this sometimes means the saving of much haulage and carriage expenditure.

At the close of the contract the Contractor often finds that he has not sufficient work in hand, or in view to keep all his motors, horses, carts, trolleys, engines, mortar mills, cranes, etc., fully employed, and further that as a surplus amount of material of various kinds has also accumulated, it will be wise to dispose of same rather than incur the expense of removing the lot back to headquarters with the possibility or likelihood of same remaining on hand for an indefinite period. When properly arranged or advertised they frequently obtain good and remunerative prices by public auction or sale on the spot.

Return to office all the foreman's plans, time, and order books, and other surplus stationery. Put them aside with other papers relating to the contract for future reference. Deliver up the keys of the building to the person appointed to receive them and notify Architect that this has been done. The final account for the work should be made up and submitted to Architect at the earliest possible moment so as to allow ample time for the settlement of any items that may arise and for the agreement of the final amount before the

maintenance period expires. After the final account of the work has been paid all papers relating to the contract, such as letters, quotations, pay-sheets, drawings, working details, etc., should be collected and made up into a parcel, on the outside of which a large label should be pasted giving the name and date of contract. The parcel should be carefully filed away for any future reference.

Every effort should be made to secure a fresh job for the foreman when the contract is drawing towards its concluding stage, and we therefore take it that our foreman has, ere this, been transferred to another job.

Damages in Contracts.—Notwithstanding the fact that every effort is being made by the representative association of both architect and contractors to bring about a form of contract that will be satisfactory and acceptable to both parties, and will tend to reduce contentious points to a minimum, there are constantly appearing cases before our courts of more or less serious character. One has only to read weekly trade papers or look up trade compendiums to verify this assertion, so that in touching upon this subject of damages we only do so in a very light manner, as the matter really requires a whole volume to itself. If in any difficulties in regard to same, the Contractor is well advised to seek professional advice but for his general guidance we venture to quote the following extracts on the subject from Anson's *Law of Contract*.

"Damages.—When a contract is broken and action is brought upon it the damages being unliquidated, that is to say unascertained in the terms of the contract, there is a difficulty in arriving at the amount which the plaintiff if successful is entitled to recover.

Rule of common law is that where a party sustains a loss by reason of a breach of contract he is, so far as money can do it, to be placed in the same situation with respect of damage as if the contract had been performed, subject to the qualification that the damages should be such as may fairly and reasonably be considered.

Where no loss accrues from the breach of contract the plaintiff is, nevertheless, entitled to a verdict, but for nominal damages only, and nominal damages, in fact, mean a sum of money that may be spoken of, but has no existence in point of quantity.

The breach of contract may result in losses which neither party contemplated nor could contemplate at the time that the contract was entered into. In such a case the damages to which the plaintiff is entitled are no more than might have been supposed by the parties to be the natural result of the breach of the contract.

Damages for breach of contract are by way of compensation, and not of punishment. Hence, a plaintiff can never recover more than such pecuniary loss as he has sustained."

In arriving at an estimate for the damage sustained by partial or complete stoppage of a contract the following items may, amongst others, be considered when the Contractor is formulating his claim :—

Percentage of expected profits.

Loss through plant lying idle.

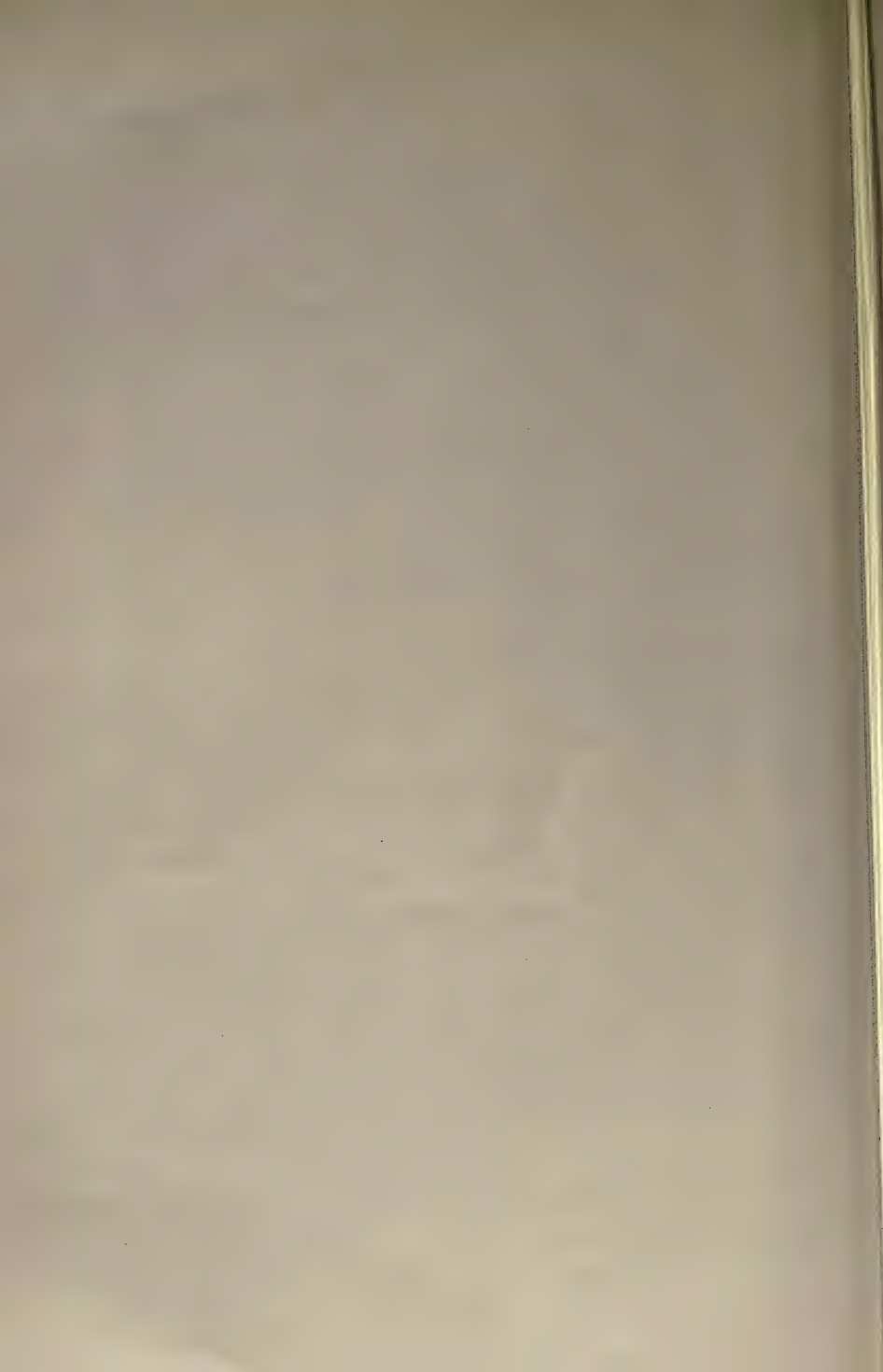
Expenses of foreman, etc., during idle time.

Interest at bank on value of work executed but not paid
for during period of suspension.

Increase in cost of materials.

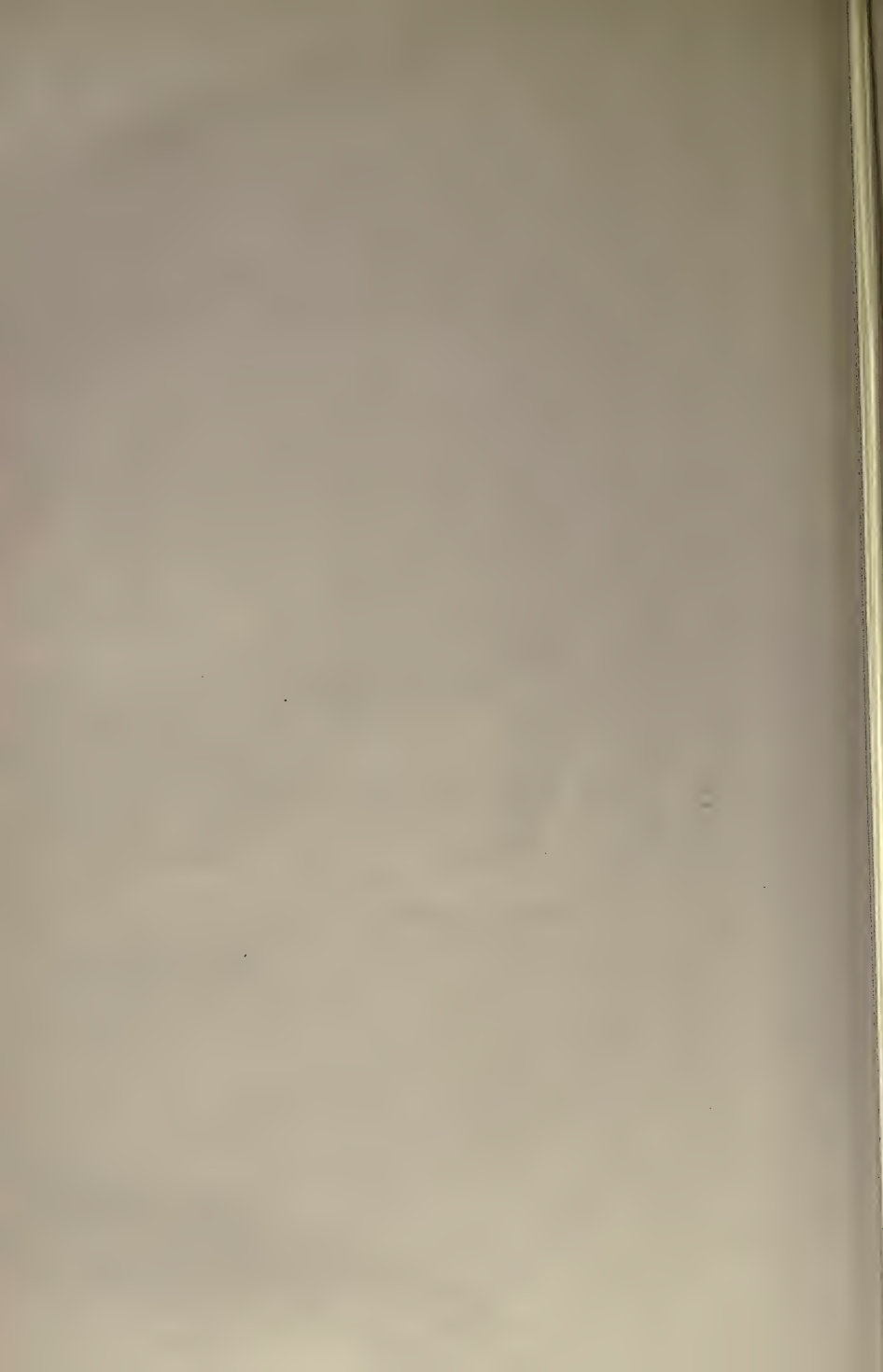
Increase in wages.

Loss of materials on site, etc.



PART II

OFFICE MANAGEMENT AND GENERAL NOTES



CHAPTER XXIII

OFFICIAL ADMINISTRATION

IN the preceding chapters our attention has almost wholly been occupied in studying outside superintendence and organisation, or the best and most economical methods for the smooth and efficient performance and prosecution of the "constructional" side of the Contractor's business. We will now divert our attention to the official or "administrative" part of the business, the consideration of which demands equal respect from us.

The importance of some of the articles which will now engage our thoughts does not appear to be fully realised by a large portion of the contracting fraternity, and it is with the object of demonstrating their value and of stimulating a broad and intelligent interest in our subject as a whole that they are being touched upon.

There are contractors who contrive to make a modest profit out of their businesses, plodding along with very little or no office or clerical assistance, but a well-equipped and staffed office is a practical necessity to a Contractor doing anything like a fair amount of business if he desires to procure the most satisfactory results possible. An efficient staff does not necessarily mean a large and expensive one. A mistake can be made by overstaffing, and a capable, efficient, well-paid assistant is, to many firms, a host in himself.

With the object, therefore, of finding in which direction real efficiency and economy lie, we will approach the second portion of our work.

Broadly speaking, the official side of a Contractor's business embraces the following duties :—

- (a) Estimating and tendering, checking quantities and making working details.
- (b) Official superintendence.
- (c) Correspondence, book-keeping, and insurance matters.
- (d) Banking and other financial matters.
- (e) Purchasing materials for stock and contracts.

- (f) Charging materials from stock to various jobs.
- (g) Payment of wages and accounts.
- (h) Rendering of work accounts and collection of same, etc.

The first of the above items has already received consideration.

Official superintendence which begins at about the same time of day as our banks open is not always satisfactory. The Contractor or his manager should very occasionally be in evidence when the men start work in the morning, either at headquarters or at one of the various contracts in hand. Apart from any other consideration the moral effect on all parties concerned cannot be overestimated. It is in the early period of the day that all classes of workmen who suffer from a slothful and indolent spirit have greater opportunity of pandering to their weaknesses. It is not to be understood from the foregoing that to make a success of his business a Contractor must be the first there in the morning and last away at night and must keep hard at it during all business hours. The natural results of such conduct would only be injurious to his health as well as detrimental to the progress of his business. What is really *implied* is that it should be the business of a Contractor to create amongst his employees an active and willing spirit of co-operation by his tactful, energetic example. Employees under such a master are invariably conscious of the fact that their efforts will ultimately be appreciated and rewarded.

A lax employer has often a demoralising effect upon his workmen, some of whom take every advantage of him and often hold him in contempt as well. Further, should an employer not be of a progressive type he cannot possibly expect to be supported by intelligent and skilful workmen.

If work done in the early part of the day is not scrupulously looked after there is very little, if any, profit made out of the labour portion by the Contractor. This is no mere assumption, since the experience of most practical men confirm such a statement as being in absolute agreement with actual facts.

Again, by early supervision valuable information can be gathered by the Contractor or his manager. He will have a more favourable opportunity of acquiring a personal knowledge of his workmen as well as his foremen, and he will be able to judge who are regular at their posts, and who can,

therefore, be relied upon to perform their duties in an energetic, intelligent, and consistent manner.

First-hand evidence of this kind is often required when workmen have suddenly to be placed in charge of any special work, or the appointment of a fresh foreman has to be made, and such evidence cannot be gleaned from time-sheets.

By keen supervision the Contractor can reduce the employment of superfluous labour to the lowest minimum on his various contracts. Some foremen are not particularly strong on this point and need looking up occasionally.

The question of apprentices for the various trades should also receive occasional attention. The recognised quota should be employed where possible.

Coming to office duties, on arrival of the post all documents should be carefully scrutinised, and any that requires particular or immediate attention should be set aside for special instruction to be given to the assistants whose duty it is to see to the matters in question.

All "statements," "invoices," "receipts," and "letters" needing no reply or immediate attention should be put in their respective files straight away, ready to be dealt with in due course (see page 238). It is well to have the desk cleared for those letters and other documents requiring immediate attention. It may cause confusion and delay when documents of secondary importance are left about, as they often conceal matters of importance.

After the morning post has been dealt with the Contractor will be free to devote the rest of the day to matters needing his personal attention, such as

Supervision or working out of tenders.

Special financial affairs.

Calls upon architects and prospective clients.

Visits to contracts in hand, timber yards, etc.

Watching, guarding, directing, and developing the business generally, etc. etc.

When visiting a contract the Contractor will, of course, endeavour to anticipate the foreman's difficulties and consult him therein and on the general requirements of the job. He will also satisfy himself that proper progress is being made, and will also make notes regarding labour and other costs on the various operations. It may be discovered by such occasional

checks that the bricklayers are laying far less bricks than the average expected of them, or that the plasterers are covering a lesser surface and area than they should, etc.

These and other matters need prompt attention and remedying.

The Contractor will leave the office in charge of a trustworthy and capable assistant, whose duty it will be to personally attend to or supervise the following work matters :—

Correspondence and book-keeping.

Cash and banking.

Purchasing or ordering of materials and following up delivery of same to avoid delays.

Statements to architects for certificates on account.

Measuring up for and rendering final accounts.

Rendering accounts for work done and material sold.

Checking invoices.

Collection and payment of accounts, rents, etc.

Supervising and replenishing the general stock.

Yard sales.

Collection and sales of scrap iron, lead, brass, etc.

Insurances.

Catalogueing all useful price lists and trade literature

Pricing and checking quantities for tendering.

Returning of empties and sacks.

Tracing and colouring plans.

Getting out working details for foremen.

Entering up extra work.

Booking up haulage and general transport.

Stock-taking and rendering balance-sheets.

Making income-tax returns, etc. etc.

Special attention should be given to the charging out of material. Goods should never be taken from stock for any purpose without first being booked up. Material should be measured, counted, or weighed, as the case may be, by responsible persons. Workmen should not be permitted access to stores, etc., without proper supervision.

It is also a part of a builder's manager's duty as well as that of the shop foreman to see that the yard, workshop, and stores are all kept tidy. A frequent inspection should be made and the point particularly impressed upon all persons responsible for the arrangement and condition of the yard stock, etc.

Some workmen have no thought of putting away material in its proper place when hunting up stuff, and often, as a consequence, things are left in a condition of chaos. This is specially so in respect of ironmongery (screws in particular), cement, nails, R.W. goods, small size timber, etc.

With regard to the collection of accounts a list of overdue book debts should be made out at least once a month and dealt with according to circumstances. Debts can only be kept in reasonable limits by such methods.

It will now be our pleasant duty to consider and devise the most reliable and expeditious methods to suit our individual requirements in regard to the various subjects enumerated above.

CHAPTER XXIV

CORRESPONDENCE

FOR easy reference, every letter, whether sent out or received, should have indicated upon it the "name" of the contract to which it refers. The part which is most troublesome and irksome in dealing with correspondence is not the actual operation involved in replying to letters as they come to hand, but that of keeping proper track and record of such replies, and seeing that the various matters are not allowed to lapse temporarily or altogether out of remembrance. In the stress of modern business it is quite easy to overlook matters unless they are properly and systematically recorded. It is, therefore, obvious that all letters to which replies are expected or which need replying to within a reasonable time should not be allowed to drift into the background. The same remark applies to orders issued by the firm.

The writer has found, after long and varied experience, that a very simple and safe way of keeping well in touch with matters of this kind is to keep a specially ruled book containing a "digest" of both the letter and order books, as per example on page 109.

It is taken for granted that a duplicate is kept of all outward correspondence (letter-book copies for preference). This being so, a short précis of all letters and orders of any special significance should be entered up daily into the "digest" and crossed off when (1) replies are received, or (2) goods supplied. A few pages should be allowed for each contract, into which the letters or orders referring to those contracts should be entered. The keeping of this book should be part of the duty of a responsible assistant, and should always be ready and up-to-date for the Contractor's inspection. This system will, as it were, produce a panoramic view of the state of the firm's correspondence, etc., and will consequently enable the Contractor to note and deal with various contingencies without delay. For instance, he may on perusal of the lists of unexecuted orders be forcibly reminded that if certain material on order is not delivered within an early date it will

DIGEST OF LETTERS AND ORDERS

LETTERS				ORDERS		
<i>Albion Hotel</i>	Letter Book Folio	Name	Subject		Order No.	Subject
July 1	672	Wright & Co.	When despatching R. W. Goods	July 2	306	Glass
" 3	675	Hardy & Jones	Certificate for £150	" 4	317	Timber
" 5	682	Hampton & Co.	Send plumbers 10th inst.	" 5	318	Nails
" 8	698	Waite & Co.	Asphaltners wanted 12th inst.	" 7	323	White lead and paint
" 10	754	Thomas & Gould	Slates must be delivered this week	" 9	331	Dressed stone
" 12	783	Devonport, Ltd.	Plastering enquiry	" 11	335	Concrete material

have the disastrous effect of holding up one of his jobs, either partly or altogether, and that immediate despatch must be insisted upon. There should be no necessity for a Contractor to visit his contracts to obtain information of this nature. It should be at his elbow in the office.

Some readers may contend that such matters can be attended to equally well without such reminders. It is true there are exceptionally gifted persons to whom such methods may appear superfluous, but to the general business man prosecuting and directing an extensive concern and employing a large amount of labour, a system such as outlined is essential if delays and misunderstandings are to be averted. It puts a Contractor in the position of feeling daily the executive pulse of his business without much loss of time or exertion on his part.

CHAPTER XXV

LETTERS, QUOTATIONS, AND RECEIPTS

IT is assumed that a special drawer is reserved in the office for the plans, specifications, correspondence, etc., of each contract. There are many excellent systems on the market for dealing with correspondence. A Contractor's "outward" correspondence (which has already been touched upon) is very easy to handle, but his "inward" correspondence requires more careful treatment. Each letter as it is being dealt with should have the name of the contract it relates to clearly written on the top of it.

From experience the writer has found that the simplest method is to keep a separate file for the letters relating to each individual contract. Files of the "Stolzenberg" type are recommended for both letters and quotations. They can be obtained in different colours, which is a decided advantage, as by adopting, say, green covers for letters and pink covers for quotations and so forth, their utility is enhanced. As the various papers are placed away in these files they should be numbered and indexed on the inside of the front cover in the manner of an ordinary letter-book. The literature is then in handy book form and easily accessible. A file of the "Shannon" type could be used with advantage for sundry letters and quotations. Some firms keep all timber quotations in a separate file for handy reference.

Receipts should be treated differently. They should be placed on an ordinary punch file and numbered in rotation as they come to hand. The receipt numbers should be placed against the various items to which they refer in the cash-book as illustrated in our example on page 215.

As letters and quotations are received by post the names of the contracts to which they relate should be written clearly on them. This device saves considerable time and misunderstanding later.

Day's Work Folder.—To facilitate the despatch of letters, etc., and to avoid confusion a folder is often employed into which are put memos. for the day's telephone calls, letters

requiring immediate reply, urgent general matters, and notes for consultation with foremen and other employees.

The whole contents of such a folder should be entirely dealt with each day if possible.

Desk Folder or Reminder Book.—An almost indispensable yet extremely simple device for the busy man's desk is a folder containing thirty-one divisions (one for each day of the month) into which memoranda *re* appointments, notes, and papers relating to deferred, suspended, or immatured matters, etc., can be placed until such time as they are ready to be dealt with. It is most valuable for following up orders, estimates, tenders, enquiries, etc. The folder should be large enough to take foolscap sized papers. It takes up very little room and could therefore be always within reach. A great advantage is that it can be used all the year round without intermission.

CHAPTER XXVI

OFFICE DIARY

THE practical utility of this book is scarcely realised or largely misunderstood by the bulk of business men. It is regarded in different ways. Some look upon it as a stationer's advertising novelty, others use it as a medium for recording special incidents which have occurred in their domestic or business lives, whilst others make use of it as a kind of rough-and-ready reminder of a few special appointments, which appears to be the sum total of its usefulness as it applies to them. A diary should, however, be on the desk of every person holding a responsible or controlling position in business affairs, not as a medium for recording past incidents, but as a practical and official guide to current and future duties, engagements, and transactions. It should be the source which enables him to execute such duties in the most expeditious manner that can be contrived. Figuratively speaking, the whole of a business man's future operations as arranged to date should be more or less mapped out in an abridged form in his diary.

If no definite plan of the day's work has been arranged, and no proper method adopted of following each particular matter to its finality, then you are not on the most direct road to a successful day's work. You are, as it were, packing your business ottoman without taking a proper inventory of its contents.

Apart from matters that crop up during the course of business and are noted up in a diary in the usual way, there are in every business duties, operations, and engagements which recur periodically (weekly, monthly, quarterly, etc.) some of "special" importance, but of all of which it is necessary to give attention to at the correct time in order to ensure the smooth and proper working of business affairs.

Probably the majority of these duties referred to are assigned to some of the office assistants, but it is nevertheless incumbent upon the person in charge to see that no neglect or oversight occurs in their performance. With a well-kept diary there is nothing to prevent him doing so with comparative ease.

DIARY

	List of Duties.		Space left for general Notes.	
1	Render monthly accounts	Sunday, June 17		—
2	File papers away, completed contracts			—
3	Sell scrap metal			—
4	Order horse feed	Monday, June 18		1
5	Follow up backward accounts			4
6	Check bank pass-book			7
7	Return empties and sacks			11
8	File letters, quotations, etc.	Tuesday, June 19		3
9	Investigate accident claims			8
10	Enquire result tenders sub- mitted			15
11	Post books to date			—
12	Order coal for portable en- gines	Wednesday, June 20		5
13	Insure contracts			10
14	Insure plant on contracts			19
15	Tabulate prices recent pur- chases			20
16	Write quarterly rents notices	Thursday, June 21		13
17	Order material for contracts			
18	Run through ledger and settle all queries			14
19	See all books indexed to date			— —
20	Write for accounts not al- ready rendered	Friday, June 22		9
21	Write Architects for deposits			17
22	Avoid ordering expensive material until next month			18 22
23	Look up and note in Diary short fire policies falling due next month	Saturday, June 23		2
				6
				12
				21
				16
	Etc.			23

The writer has found, after long experience, the following method very serviceable for the purpose suggested. A compact list of the principal recurring duties should be made out and pasted on the inner side of the front cover of the diary. Each item in the list should be numbered and the numbers entered on each day throughout the year on which the duty falls due for attention. It may seem to some a little irksome to enter up the numbers as indicated, but once this has been properly done one can rest assured that so far as the scheduled duties are concerned there is not much fear of their being overlooked, as on each day these numbers will act as a reminder that the particular duties fall due for execution. By this system new duties of any special importance that may crop up can be added to the list at any time.

A practical illustration of this system will be seen on page 114, and the writer earnestly recommends it as being a great time and worry saver. It of course lends itself to expansion or contraction, as circumstances demand.

CHAPTER XXVII

TRADE EXPENSES.—ESTABLISHMENT OR OVERHEAD CHARGES

A BRIEF outline of trade expenses will be found on page 3, and a practical suggestion is given in example on page 226 for the disposal of them on a percentage principle, so that they will become chargeable on every item of work executed. To see that all these expenses are duly charged so as to make them recoverable in one way or another, is of paramount importance to a Contractor, but the special purpose of this article is to consider one or two ways in which the saving of expenses is likely to be effected. A Contractor has not always a free hand with other items of expenditure, but he has with those which affect his trade expenses account and the success of many firms can be largely attributed to their wise management in this direction.

A Contractor should constantly be on the alert to prevent waste and unnecessary expenditure. For instance, "stock" swallows up profits and preys on the very vitals of many businesses. "Overstocking" is, therefore, a very formidable phase of unnecessary expenditure. A very striking fact which must not be lost sight of is that with all the modern conveniences ready at hand for obtaining material of every description at the shortest notice there is absolutely no need for a Contractor to carry large and expensive stocks on which he will have to pay to his bankers at least 5 per cent per annum for any overdraft that may be needed in the purchase of same.

There are, of course, certain classes of material which it is necessary to keep a goodly stock. Such as timber for joinery work, etc., which ought to be purchased long before it is actually required for conversion on the bench in order that it may have ample time to thoroughly season. There are also other items, such as mentioned on our short list on page 129, which go to make up a Contractor's general stock, as they are in constant demand in all progressive businesses and cannot, therefore, be treated as dead stock. It is again prudent to purchase in advance material that will certainly be required

for any new contracts and on which there is likely to be an advance in price, but nothing justifies the crowding out of a Contractor's yard with all manner of goods with no definite prospect in view as to their ultimate disposal. Money "lying dead" is always a great hardship to men actively engaged in business, and although more or less unavoidable it must not be allowed to take unbearable dimensions, but, on the contrary, should be brought down to the minimum. Other forms of demand on trade expenses are alterations, repairs, additions and general upkeep of business premises, etc. Although these expenses can subsequently be viewed in the light of capital improvements, yet they are in reality attacks on trade expenses, and therefore should not be embarked upon without a clear warrant that a corresponding advantage will ultimately accrue. Trunk calls, telephone charges, etc., are a part of trade expenses. It is well to keep a record of all calls made so that unscrupulous use of the telephone system by unauthorised persons may be prevented. This is especially useful in view of the new system of the Post Office of charging for each call made.

Motor-cars, motor cycles, ordinary bicycles, etc., are now considered a necessary part of a Contractor's managerial outfit. It should be seen that these accessories are properly looked after and not allowed to get into bad repair or premature disuse; further, their indiscriminate use should not be tolerated.

Painters' brushes is another item of trade expenses. When brushes are brought in from a job they should be immediately cleaned and put away into water or oil, otherwise they will become practically useless for further work. Painters are not all blessed with a sense of economy and require constant reminding on such points.

Close supervision should also be exercised in regard to coal for office and other uses, and also on gas and other artificial means of lighting and heating, etc.

Some managers and foremen have a very costly and thoughtless habit of sending carts or handtrucks to merchants' stores, etc., for material, when in nine cases out of ten the prices charged for the material include for delivery, and would be secured equally as well by a message over the 'phone or a post card to the merchants.

Office wages are also a part of trade expenses, but, as we have

pointed out elsewhere, it is false economy to have an underpaid, inefficient staff.

A keen watch on everything appertaining to rents, rates, taxes, repairs, stationery, and insurance, also tends to keep trade expenses within proper bounds.

The prompt payment of accounts by the Contractor has a beneficial effect on trade expenses, etc., as pointed out on page 164.

An enterprising Contractor will also institute an efficient follow-up system in regard to accounts and certificates due to him. These measures all make for economy.

CHAPTER XXVIII

BANKING AND BANK CHARGES

It is intended in this short article to deal with the subject only so far as it primarily affects the interest and well-being of a Contractor's "current" banking account. The ordinary everyday transactions with banks are common knowledge to most business people. It is, therefore, not proposed to touch upon them here. It is taken for granted that all monies received by the Contractor will be banked into his account on the day of receipt, or thereabouts. To the trader, the chief point of interest regarding banking is the actual amount he has to pay for the conveniences of same.

Joint-stock and private banks are not philanthropists. Their business consists of trading in money, viz. receiving, lending, and exchanging, and they expect, like all other business firms, a good return for their services.

Practically speaking, their profits consist in the difference between the rate of interest allowed on deposits and that received from loans. Therefore, as a Contractor's position is chiefly that of a borrower, it is up to him to obtain from his bankers the best and most reasonable terms he possibly can. Banks usually make advances for financing commercial transactions and assisting industrial developments. Such advances are more or less difficult to obtain, as much depends upon the status of the borrower. It is the trader's business to avoid the imposition of unduly onerous conditions, and also the demand of excessive securities being exacted from him by his banker. Obviously hard conditions and high charges severely handicap any class of business.

A Contractor should be quite clear in regard to the terms on which his account is opened. They should, we repeat, be reasonable and contain a proviso that when the turnover is increased beyond certain limits the rates of charges should be correspondingly decreased. Further, it should be definitely understood and agreed upon that when the account is in credit (as often occurs) reasonable interest should be allowed by the banker during such periods.

Each customer of a bank is given a Pass Book, which is a copy of his account as it appears in the books of the bank. This book is periodically entered up, and at the end of each quarter or half-year the bank's charges thereon to date are entered therein in one item.

The writer is tempted to ask :—

- (1) How many customers are able to check these charges ?
- (2) If able to check them, how often do they satisfy themselves that they are correct ? And also
- (3) How often are they passed by the accountants, auditors, and such-like without the least enquiry as to their accuracy ?

Some firms attach little importance to these charges, as their accounts are not very large, but to others, on the other hand, they become a serious and often menacing trade expense, which should require full consideration and examination.

Bank charges should at all times be properly checked, no matter what the size or extent of the trader's account.

It does not indicate a very healthy state of supervision when charges are allowed to pass unchallenged year after year.

It is a rare occurrence to find errors in the ordinary debit and credit entries of a bank pass-book, but the same remark cannot be made in regard to bank charges. Errors are made, and our object is to give assistance that will enable the reader to satisfy himself whenever such charges are levied on him in his account.

We will assume, for sake of illustration, that an account has been opened with a bank on the following terms :—

5 per cent per annum to be debited on any overdraft.

1 per cent per annum to be credited on any credit balance.

One-sixteenth of a £ (or 1s. 3d.) per cent on his bank turnover.

“Turnover” means the amount paid out by a customer through his bank in a given period. In other words, the amount of cheques, etc., drawn by a customer in favour of various people and which have been debited to his banking account.

In order to ascertain how bank charges may be checked the reader is referred to our example on page 123, where he will note the following process has been observed :—

- (1) The daily balances in pass-book are ascertained.
- (2) Total number of days the account has been in debit and credit arrived at.

- (3) Interest on debits and credits worked out on terms agreed upon.
- (4) The turnover commission is worked out and added thereon.

It may be mentioned in regard to item No. 1 that the customary three days must be allowed the bank for the collection of all cheques paid in to them which are drawn upon other banks. (This remark does not, of course, apply to Bank or Treasury notes, and cash.)

It is to the customer's advantage that his bank charges be debited half-yearly, as is the practice with many of the principal banks. If they are debited quarterly interest on such charges will accrue in the succeeding quarter, and where they are heavy the bank (in consequence) obtains a considerable pull on their customers.

Bank charges are usually entered up in the pass-book in a lump sum, but if arrangements are made for the interest, commission, etc., to be shown separately the checking of same will be greatly facilitated.

The "commission charge" demands the greatest attention of the customer.

Commission should be charged at a lower rate when the account is working on credit than when on debit. Again, if a customer has two or more accounts at a bank, commission should not be charged on "transfers" from one account to another.

If a current account is almost constantly in debit (as is generally the case with ordinary business firms) checking charges is a very simple matter; but when the account is constantly in and out of debit the matter is a little more complicated. In order to be as varied as possible we have chosen for our example a month's working of an account of the latter type. It will be noted that the same formula applies to working out the interest of both debit and credit balances, the only difference being in the rates per centum of each, as already pointed out.

We have adopted the method shown in our example of arriving at the interest, as we consider it is practical and applies itself more easily to the needs of an ordinary business man's account than the system adopted by banks, who work out the interest of their customers' accounts daily on the

formula given below. The principle governing both methods is the same.

Multiply the number of pounds (constituting the balance of the account) by the number of days such balance has been in existence and divide the product by 7300.¹ Thus an overdraft of £1550 for three days @ 5 per cent per annum would incur a charge of 12/9.

$$£1550 \times 3 \div 7300 = 12/9 \text{ interest.}$$

We think with these few points explained the reader should be able to thoroughly satisfy himself in regard to his bank charges, i.e. provided he has a clear understanding with his banker in regard to the terms of his account, which condition is, of course, essential.

Should the reader desire to pursue the subject of banking further, he will find a very useful little manual published by the *Financial News*, entitled "Bankers and Bank Balances: How to Manage Both."

¹ The correct divisor is in all instances to be found by multiplying the number of days in the year by 100 and dividing by the rate per cent.

January	Debit Balance			Credit Balance			
	£	s.	d.	£	s.	d.	
1	218	14	5	—	—	—	Balance on debit 21 days
2	226	16	5	—	—	—	„ credit 10 days
3	204	11	2	—	—	—	<i>Debit interest @ 5% per annum</i>
4	209	11	5	—	—	—	8862 21 5 8862
5	—	—	—	303	17	11	$\frac{8862}{21} \times \frac{21}{100} = \frac{8862}{100}$
6	—	—	—	419	13	6	21 385 100 7300
7	—	—	—	573	8	6	73
8	629	1	11	—	—	—	7300)8862(1£
9	634	6	10	—	—	—	7300
10	623	5	10	—	—	—	1562
11	667	0	9	—	—	—	20
12	—	—	—	332	15	11	7300)31240(4
13	—	—	—	168	18	2	29200
14	267	7	1	—	—	—	2040
15	272	17	1	—	—	—	12
16	301	15	4	—	—	—	7300)24480(3
17	541	7	7	—	—	—	21900
18	544	8	9	—	—	—	2580
19	—	—	—	204	11	9	Debit interest = £1 4 3
20	—	—	—	341	16	8	Assumed Turnover, say, £4055 @ 1% 2 10 8
21	—	—	—	218	10	2	3 14 11
22	678	6	4	—	—	—	<i>Credit interest @ 1% per annum</i>
23	694	17	8	—	—	—	2993 10 1 2993
24	422	3	4	—	—	—	$\frac{2993}{10} \times \frac{10}{100} = \frac{2993}{100}$
25	—	—	—	91	10	2	10 365 100 36500
26	—	—	—	337	17	3	2993
27	270	10	11	—	—	—	20
28	472	16	9	—	—	—	36500)59860(1
29	546	10	0	—	—	—	36500
30	120	6	0	—	—	—	23360
31	315	4	5	—	—	—	12
	£8862	0	0	£2993	0	0	36500)280320(7
							255500
							24820
							say, 0 1 7
							£3 13 4
							<i>Nett Bank Charges for the month</i> £3 13 4

CHAPTER XXIX

PRICE BOOKS

AT least three kinds of price books should be kept in a Contractor's office, viz. :—

1. For recording purchases made.
2. For use in pricing up goods charged through the general stores.
3. For registering all useful standard lists and memoranda applicable to the trade.

The first should be in the form of a small-sized ledger, ruled in columns as example below. This book should have an index. A page, or half-page at least, should be devoted to each article. The various prices of goods purchased should be entered into this book every month from the invoices, e.g.:—

ASBESTOS SHEETS

Date.	Invoice No.	Name.	Description.	Price.	Carriage.	Contract.
1919 Sept. 9	150	W. Simpson & Co.	$\frac{3}{8}$ Asbestos sheets, 4' x 4'	5/6 yd. super., f.o.r. London	About 3d. yd.	Theatre
1920 Oct 15	219	Barnard & Co.	Corrugated sheets	6/6 yd. super., f.o.r. London	„	Bank

It is not necessary or desirable to enter up records of small purchases, but an entry should be made of every purchase that it is thought may be repeated at any future date.

This arrangement will provide a Contractor with a ready means of ascertaining information in regard to any previous transactions, and will be of special service to him in estimating. It is always convenient to know the prices and the firms from whom previous purchases were obtained.

The second price book should be made up in alphabetical form and should be revised quarterly. There may be no drastic

alterations required, but any serious advances or reductions should be noted.

In compiling a book for general stores purposes a percentage for haulage, handling, stocking, and general trade expenses should be added to the invoice price.

The following example will give the reader a general idea of the contents of the price book now suggested :—

Air bricks (red)	. . .	9"×3", 9d. each.
"	" . . .	9"×6", 1/- "
"	" . . .	9"×9", 1/9 "
" (iron louvre)	. . .	9"×3", 9d. painted, 1/- glvzd., each.
"	" . . .	9"×6", 1/- " 1/3 " "
Alum	. . .	4d. per lb.
Angle-iron	. . .	24/- cwt., 4d. per lb.
Asbestos	. . .	3/6 per lb.
Axle pulleys	. . .	1 3/4", 8d. each.
		2", 9d. "

The third price book should consist of all the latest printed standard price lists, etc., such as the following :—

GENERAL TRADE LISTS, ETC.

Asbestos slates.	Galvanised cisterns.
Asphalt work.	" corrugated sheets.
Belting.	" wire-netting.
Broseley tiles.	Gates and railings.
C.I. colum (weights).	General ironmongery.
" pipes and connections.	Glass (sheet and plate).
Contractors' Association Day-work prices.	Glazed bricks.
Copper boilers and cylinders.	" channels.
" furnace pans.	Iron and steel weights (bars and plates).
Damp course.	Lead (sheet and pipe).
Drain-pipes and connections (G.S.).	Local builders' merchants.
Duprez skylights.	" ironmongers.
Encaustic and glazed tiles.	" poor rate assessment list.
Expanded metal.	" timber merchants.
Facing bricks (various).	" waterworks charges.
Felts (roofing, etc.).	" trade working rules.

Nails.	Slates.
Oil measurements.	Slating (standard measurement).
Painters' brushes and tools.	Timber prices (soft and hard wood).
Paint and colours.	„ labour charges.
Pan tiles.	„ sawing and planing charges.
Plumbing brass fittings.	Tubing (W.I.), gas, water, and steam.
R.S. joists "extras" price list.	Ventilators.
R.W. goods.	Washable paints.
Railway rates.	Willesden paper.
Screws (iron and brass).	
Sinks.	
Sirapite, etc. (covering capacity).	

These will be found useful for reference in pricing up material. The various discounts and terms affecting each list should be clearly noted thereon and, if possible, kept fairly well up to date.

CHAPTER XXX

PURCHASING AND KEEPING STOCK

THE prices of materials are largely regulated by the law of supply and demand, yet notwithstanding this fact it requires constant devotion to the subject, both in regard to research, and the recording of previous transactions, to become a capable buyer, one who can discriminate between a rising and falling market and act accordingly.

In the purchasing of materials there are many points to be considered. The lowest price is not necessarily the cheapest or most economical for the Contractor. One has to guard against inferior quality, irritating delays, inattention to instructions, carelessness in details, misfits, etc., and experience is, to a great extent, the only reliable guide in the matter.

The price book suggested on page 125 and an efficient system of catalogueing useful literature will be found a great factor in keeping one up to date. The various trade papers, directories, and compendiums should also have careful consideration. In view of the ever fluctuating nature of market prices it is a mistake to order goods of any quantity without first obtaining quotations.

A well-considered list of makers and merchants of not too "local" a character should be made before sending enquiries for prices. A haphazard list often gives unsatisfactory results. Fresh names should from time to time be included in the enquiry list. It is only by constantly trying new as well as old ground that the best results can be obtained.

Avoid as much as possible buying or stocking goods that are not in general demand. For general stock purposes the abridged list on page 129 will give an idea of the stock a Contractor will be justified in holding, though on that point much depends on the special circumstances of each firm and of the locality.

There are numerous articles (such as drain-pipes, felt, glazed bricks, Broseley tiles, wire-netting, plate-glass, screws, nails, gas- and water-pipes, etc.) which are sold from recognised standard lists, which are subject to advances or discounts

according to the state of the market, so that it is not always necessary to furnish full details of one's requirements when sending enquiries out.

An enquiry on the following lines, for instance, will be deemed sufficient when seeking information in regard to cut nails or screws :—

“ Please quote us your lowest delivered price for 2 tons cut clasp nails, 3" to 6" basis.”

Or,

“ Kindly quote us present discounts off list for Nettlefold's iron and brass screws for a parcel of, say, £50 nett value delivered.”

In these days of differing terms and varying discounts it is obviously essential that all competitive quotations be worked out to their nett figures before deciding where to place orders. This point is an important one, but is sometimes overlooked.

It should, however, be pointed out that contractors can often buy to better advantage from builders' merchants than direct from manufacturers. It is always well to include builders' merchants in one's enquiries, though one of the disadvantages of placing orders with them is the delay often experienced in their execution. The contractor's orders when placed through a merchant are, in the natural course of things, placed at works in rotation with other orders that the merchant may have with the manufacturers, whereas if the Contractor places his orders direct with works he may possibly obtain immediate despatch.

There is a practice in vogue with some merchants of consigning all their traffic “carriage forward,” even when goods have been quoted carriage paid. This has two disadvantages as far as the Contractor is concerned. (1) All breakages, shortages, etc., will have to be dealt with by him, and (2) the likelihood of paying the carriage and not being reimbursed. Again, builders' merchants consign goods to “their order,” and not to the Contractor. By this a delay sometimes occurs in advising the Contractor of arrival, and demurrage often follows as a consequence.

Builders' merchants are very convenient and often indispensable to a Contractor, but when a Contractor's credit is sound, and he can purchase direct from makers, it is usually to his advantage to do so. On the other hand, it is often to

a Contractor's advantage to keep in close touch with the merchants who carry stocks. Some things when scarce can possibly be purchased to advantage, as often the markets available to a merchant offer a wider scope than a Contractor could possibly find by purchasing direct from the manufacturer. In the matter of credit also he can often secure better terms.

Let the merchants have enquiries; sometimes it will be found that the prices are more favourable than could be obtained direct.

The subject of purchasing naturally leads to the question of ordering, and as so many issues depend on the way goods are ordered we cannot do better than devote a few pages in our next chapter to the leading points which comprise the art of issuing orders in a satisfactory manner.

TIMBER.

2nd and 3rd Archangel Red.

11" × 4"	}	For door and window frames, etc.
9" × —		
11" × 3"		
8" × 3"		

9" × 2½"	}	For yard and entrance doors, etc.
8" × —		
7" × —		
6" × —		

11" × 2"	}	For glass and panel doors, sashes, stair strings, etc.
9" × —		
8" × —		
7" × —		
6" × —		

11" × 1¾"	}	For glass and panel doors, sashes, stair strings, etc.
9" × —		
8" × —		

11" × 1½"	}	For cupboard and panel doors, stair strings, etc.
9" × —		
8" × —		
7" × —		
6" × —		

$11'' \times 1\frac{1}{4}''$ $9'' \times -$ $8'' \times -$ $7'' \times -$	} For cupboard and panel doors, stair treads, window boards, architraves, etc.
$11'' \times 1''$ $9'' \times -$ $8'' \times -$ $7'' \times -$ $6'' \times -$	} For window linings, cupboards, skirtings, fascia shelvings, etc.

Also a stock of Common Red, $7'' \times 2''$, $6'' \times 2''$, $5'' \times 2''$, $4'' \times 2''$, and $3'' \times 2''$, for general use. Prime Silver Spruce is also in demand.

American Whitewood boards, $\frac{7}{8}''$ and $\frac{1}{2}''$ thick, 18" to 24" and up wide, for panels, casings, fascias, etc.

Mahogany cut from log, about 18' long \times 26" square, into $\frac{1}{2}''$, $\frac{3}{4}''$, 1", $1\frac{1}{4}''$, $1\frac{1}{2}''$, 2", 3", 4" planks, and 5" or 6" thick heart or centre planks.

Pitchpine logs, cut into $\frac{5}{8}''$, $\frac{3}{4}''$, 1", $1\frac{1}{2}''$, $1\frac{3}{4}''$, 2", 3", 4", and 5" planks.

American Oak planks for sills, 3" to 4" thick, 10" to 20" wide, about 15' average length.

Wainscot Oak, 1" to 3" thick, 10" and up wide, 9' and up long.

Teak for general fittings.

11" and $9'' \times 1''$ white prepared boards.

$7''$ and $6'' \times 1''$ square edge flooring.

$7''$ and $6'' \times 1''$, $\frac{3}{4}''$, and $\frac{1}{2}''$ matched boards.

U.S. or 3rd Archangel, for mouldings, sash and door stuff.

2nd Archangel, for smaller mouldings.

Columbian Pine, about $14'' \times 4''$, cut into $\frac{1}{2}''$ and $\frac{5}{8}''$ boards for panels; also Alder, Birch, etc., plywood boards for panels, etc.

Architraves—

$4'' \times 1\frac{1}{4}''$, $4\frac{1}{2}'' \times 1\frac{1}{4}''$.

Band mould—

$2'' \times \frac{3}{4}''$, $2\frac{1}{2}'' \times 1''$, $3'' \times 1''$.

Drop mould—

$1\frac{1}{4}'' \times \frac{1}{2}''$, $1\frac{1}{2}'' \times \frac{1}{2}''$, $1\frac{3}{4}'' \times \frac{5}{8}''$.

Bolection mould—

$2'' \times 1\frac{1}{4}''$, $2\frac{1}{4}'' \times 1\frac{1}{2}''$, $2\frac{1}{2}'' \times 1\frac{1}{2}''$.

Sash stuff, $1\frac{3}{4}''$ and 2".

Meeting bars, $2\frac{1}{4}'' \times 1\frac{1}{4}''$.

Prepared, moulded, and re-bated door framing, $3'' \times 4\frac{1}{2}''$.

Stop bead, $1'' \times \frac{3}{4}''$, $\frac{7}{8}'' \times \frac{5}{8}''$.

Parting bead, $1'' \times \frac{3}{8}''$.

Quoin, $\frac{3}{4}'' \times \frac{3}{4}''$, $\frac{7}{8}'' \times \frac{7}{8}''$.

Torus skirting, $6'' \times \frac{3}{4}''$, $7'' \times 1''$.

O.G. and sunk skirting, $9'' \times 1''$.

Slating laths, $1\frac{3}{4}'' \times \frac{3}{4}''$, $2'' \times \frac{3}{4}''$.

Plasterers' laths—

2' 8", 3', and 4' long.

Rainwater pipes, $2\frac{1}{2}$ " and 3" diam., also bends, shoes, etc., for ditto.

H.R. and O.G. gutters, 4" and $4\frac{1}{2}$ " diam., also angles, stop-ends, etc., for ditto.

SCREWS

Iron (Flat head).

$\frac{3}{4}$ " \times 6", 7", 8", and 9".
 1" \times 6", 7", 8", 9", 10", 11",
 and 12".
 $1\frac{1}{4}$ " \times 7", 8", 9", 10", 11", 12",
 and 14".
 $1\frac{1}{2}$ " \times 8", 9", 10", 11", 12", and
 14".
 2" \times 11" and 14".
 $2\frac{1}{4}$ " \times 12" and 14".
 $2\frac{1}{2}$ " \times 12" and 14".
 3" \times 12" and 14".
 $3\frac{1}{2}$ " \times 14" and 16".
 4" \times 14" and 16".

Brass (Flat head).

$\frac{1}{2}$ " \times 4" and 5".
 $\frac{5}{8}$ " \times 4", 6", and 7".
 $\frac{3}{4}$ " \times 5", 6", 8", and 9".
 1" \times 6", 8", 10", and 12".
 $1\frac{1}{4}$ " \times 6", 9", and 10".
 $2\frac{1}{4}$ " \times 12" and 14".
 $2\frac{1}{2}$ " \times 14" and 16".

Brass (Round head).

$\frac{1}{2}$ " \times 5" and 6".
 $\frac{5}{8}$ " \times 6" and 7".
 $\frac{3}{4}$ " \times 7" and 8".
 1" \times 10" and 12".
 $1\frac{1}{4}$ " \times 12" and 14".

Louvre air bricks, 9" \times 3" and
 9" \times 6".

Sash cord, Nos. 5 and 6.

Sash fasteners.

Sash weights.

Axle pulleys, $1\frac{3}{4}$ " and 2".

Sandpaper, Nos. 1, $1\frac{1}{2}$, 2, and
 $2\frac{1}{2}$.

Emery cloth.

Glue.

Steel cut nails, $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", 2",
 $2\frac{1}{2}$ ", 3", 4", $4\frac{1}{2}$ ", 5", and 6".

Floor brads, 2", $2\frac{1}{4}$ ", and $2\frac{1}{2}$ ".

Sprigs and panel pins, $\frac{3}{4}$ ", 1",
 $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", and 2".

Oval wire nails, $1\frac{1}{2}$ " and 2".

Copper and zinc slate nails,
 $1\frac{3}{4}$ " and 2".

Cement, sand, lime, and plaster (in small quantities).

Slates, 24" \times 12", 22" \times 12", 22" \times 11" and 20" \times 10".

Files: mill-saw, band-saw,
 bastard, etc.

Galvanised wall ties.

Cast-iron butts, 2" to 4".

Wrot steel butts, 4" and 5".

Brass butts (medium), $1\frac{1}{2}$ " to 3"

Tee hinges, 8" to 16".

Norfolk and night latches.

Rim and mortice locks, 6".

Barrel and tower bolts (brass
 and iron), 4", 6", and 9".

Cupboard and drawer locks,
 $1\frac{1}{2}$ " to 3".

Bolts, nuts, and washers, $\frac{1}{2}$ ",
 $\frac{5}{8}$ ", and $\frac{3}{4}$ " \times 4", $4\frac{1}{2}$ ", 5", $5\frac{1}{2}$ ",
 6", $6\frac{1}{2}$ ", 7", and 8".

Hex, round hex, and square-
 round hex.

Drain-pipes, bends and junctions, 4" and 6".

Gulleys for do.

Fire burrs, 9" × 9" and 12" × 12".

Sundry painters' brushes.

Hard oak varnish (inside and outside).

Whiting.

Glazing putty.

Linseed oil and turpentine.

Genuine white and red lead.

Best Middle Brunswick green, in oil.

" Black "

" Turkey umber "

" Venetian red "

" Oxford ochre "

" Purple brown "

" Chrome "

Dry Ochre

" Venetian red.

" Vandyke brown.

Patent driers.

Raw and burnt sienna in oil and water.

Distemper, white, buff, and green.

4 lb. and 5 lb. rolls sheet lead.

$\frac{1}{2}$ " × 5, 6, or 7 lb. lead pipe.

$1\frac{1}{4}$ " × 10 lb. lead pipe.

$1\frac{1}{2}$ " × 11 lb. "

Sheets of No. 10 and No. 12 zinc.

It is scarcely realised what a large percentage of time and material is wasted at many yards by the deplorably chaotic condition in which the general stock is kept. The yard should at no time be permitted to get out of order. A specific place should be allotted to all kinds and sizes of timber, slates, drain-pipes, and connections, bricks, rainwater goods, nails, general ironmongery, etc., and someone held responsible for such order.

CHAPTER XXXI

ORDERS: HOW TO ISSUE THEM, ETC.

It requires close attention and mature experience to deal satisfactorily with all classes of orders that have to be issued from a Contractor's business. There are so many ways in which one is liable to get into difficulties, either by the omission of some vital condition, or of special terms or discounts agreed upon, or the inclusion of an unnecessary clause, or even by the general vagueness of the wording of an order. Bearing this in mind, and with a view to eliminating as much as possible such discrepancies, we have taken a few examples of the more general class of goods and work usually dealt with by contractors, and recorded a few points which have to be considered when issuing orders for them.

Such orders should include some of the following conditions when applicable :—

- (1) Time and place of delivery of goods.
- (2) Time work has to be started and period allowed for completion.
- (3) Prices, cash and trade discounts, and mode of payment.
- (4) Nature, quality, and description of goods with particulars of any special design or make specified.
- (5) Submit templates, patterns, and sizes, when necessary.
- (6) Quality of goods to be equal to any submitted sample.
- (7) Work to be executed to Architect's satisfaction on all subcontractors' orders or prime cost items.
- (8) Definitely state who provides scaffolding and lifting gear.

Whenever possible, place orders for delivery of goods and material in the early stages of the month, so as to obtain the fullest credit on same—payment of accounts being usually due the month following delivery.

When placing orders which necessitate the employment of labour on the job, e.g. asphaltting, ferro-concrete work, patent glazing, plumbing and electrical engineering, wood-block

flooring, etc., the following or similar protective clauses should be inserted :—

- (a) The work to proceed without intermission, unless otherwise arranged.
- (b) It is understood that in placing this order the undersigned are indemnified from any action of your workmen under all Workmen's Compensation Acts.

A Contractor should endeavour to purchase all goods which have to be delivered by rail, carriage paid. By so doing much worry and correspondence will be saved in relation to "breakages in transit," "short deliveries," etc., as the onus for making claims in respect thereof invariably falls to the lot of the party who pays carriage.

When work is executed at a fixed price per foot super, such as asphaltting, wood-block flooring, wall tiling, etc., an account of the actual superficial area of the work required to be done should accompany the order to enable the subcontractor to have an opportunity of agreeing to the same, or otherwise before proceeding with the work. If this is not convenient, a definite stipulation should be inserted that only the actual superficial area of work executed will be paid for.

A rule should be adopted that no order be given unless some or all of the preceding particulars applicable thereto be embodied therein. Many orders have special features which should, of course, be included. Before issuing orders for prime cost or other special items on the Architect's instructions, a request should be made for a copy of the maker's or merchant's quotations. If it is found that no trade discount has been reserved for the Contractor an endeavour should be made to obtain one, or at least a special "cash" discount for prompt cash payment. The latter can often be obtained when no trade discount has been provided.

After an order has been issued, it is essential that it be noted up in the Letters and Orders Digest, as suggested on page 109, i.e. if the order is one of special significance and would need following up if any delay occurred in its execution. This is a point that should not be overlooked.

Again, when large quantities of material such as bricks, R.W. goods, stone, slates, etc., are ordered and come on from works in instalments, a list should be made or record kept

(preferably on the order counterfoil) of each consignment as it comes to hand, so that a glance at any time will show how matters stand in regard to the execution of the order. We will now deal individually with a few items of general interest.

Asbestos Slates.—State colour, size, patterns, name of special slate (if any specified), number of slates, copper rivets, and nails required (see Slater and Roof-tiler, page 282).

Asphalt Work.—Submit complete detailed plan and specification of work, including kind and quality and brand of material specified, also give superficial measurements of flats, and lineal measurements of fillets, skirtings, labour items for outlets. "Vertical" work should be measured separately.

Any maintenance guarantee which has been given under the contract should be incorporated.

State clearly if portions of the work have to be executed on separate occasions, also that asphalters must provide the necessary labour for hoisting their material and plant into position where and when necessary.

Blackboard (Slate) for Schools.—Give number of stretches required with lengths, width, thicknesses, etc., e.g. 1 stretch rubbed black slate blackboard $13' 9'' \times 1' 7\frac{3}{4}''$ as sketch (a), 1 stretch do., $20' 0'' \times 2' 2\frac{7}{8}'' \times \frac{3}{4}''$ as sketch (b), all to have perfectly true faces and rubbed joints, slabs to be in as long lengths as possible, each to have sufficient counter sunk holes for securing same to walls, also to be lettered A, B, etc., as described, ready for fixing. A different letter should be given to the slate boards required for each room.

Blinds.—State if "Venetian," "roller," "wire," "pino-leum," "sun," etc., self-acting shop blind. State if for "inside" or "outside." Give sizes and description, including particulars of rollers, quality and colour of blind material, cords, holders, and all necessary iron or brass fittings and any wood casings or boxing; if painted, or stained and varnished.

Blind-maker to take own sizes and particulars on the job and to guarantee blinds to work satisfactorily.

Bricks.—When ordering common bricks from Architect's quantities make due allowance for the fact that all facings, glazed and special bricks, are taken as "extra" over common bricks. Follow Bill of Quantities to a great extent when ordering special bricks, stops, angles, etc.

Brosley Tiles.—Note that they must be all holed and

nibbed, ready for fixing, and supplied to the tint selected by Architect. Give pitches for valley hip and ridge tiles. Note clearly number of half, three-quarter, whole, and special tiles required.

Carving and Sculpture.—Follow specification or Architect's instructions, and state clearly if scaffolding, attendance, shelter, and screens are provided by Contractors or otherwise. Work to be executed to Architect's satisfaction. There is usually a provisional amount for this work.

Casements (W.S.)—Give full-size sections of heads, jambs, sills, mullions and transomes (if any) showing where sizes have been taken, marking the outside of the opening and giving exact size. Also give the section required and pattern of fittings, and how casements above and below transome to be hung. If the casements are to be glazed with leaded lights which have no reinforced steel corners state number of saddle-bars required, giving positions, if with sheet glass thickness of same. The whole to be perfectly watertight (see Iron Sashes).

Channelling (white glazed).—State lengths, widths, and depth of channels, number and position of outlets, stop ends, bends, junctions, tapers, etc.

Cloak-room Fittings.—Give number and particulars of H. and C. hooks required, particulars and thickness of fittings, and wire-netting, number of umbrella stands, and trays. Enclose fixing plan.

Columns (cast-iron).—Give design, thickness of metal, length over all, and also diameter of top and base of column, also particulars of caps, and base plates with number of holes, bolts, etc.

Coping.—Give average lengths required, and state size and shape (e.g. 14 in. half-round, single or double chamfered, etc.), also if all straight, or part circular on plan. Give number and particulars of all angles, stops, and returned ends, etc. When stone coping required state all to be jointed ready for fixing.

Copper Cylinders.—State if pure copper, or weighted, if riveted, plain or corrugated. Give pressure, size, and number of gallons required, particulars of flanges or unions, with sketch showing their position, etc.

Crests.—See Ridge and Hip Crests.

Dressed Stonework.—The trade name of the stone,

such as "Box ground," "Farleigh," "Grey," or "Blue Forest," etc., should be clearly stated on order, and the following clause inserted: "All to be accurately worked to detail, rubbed on exposed facings, well seasoned, free from vents, and holes, or any other defects, to be worked on its natural bed, and tooled square. Stones to hold up their full scantlings as given on working details, each to be given a distinctive mark to facilitate fixing. A detailed list of the stone, with cubic contents, should accompany order, and any question which may arise relating to the accuracy of same should be adjusted before the order is put in hand. It is essential, also, to give directions as to the order in which the stone should be delivered to the job. All stone to be properly packed with shavings or other suitable packing when being delivered to avoid breakages (see note in "Mason," page 50).

Electrical Services.—Submit Architect's detailed specification, and plan, with all positions, points, etc., clearly marked. Mention all necessary cuttings, and "making good" which have to be done, give date when work to be commenced, and also when to be completed. Order must be given on the understanding that defects arising from faulty workmanship or materials during maintenance period to be made good free of charge (fair wear and tear and usual recharging of batteries excepted), also local authorities' rules and regulations to be complied with in every respect.

Fireproof Floors, Partitions, Plate Walling, etc.—Include Architect's full specification, also general conditions as to time for completion, etc. Give thickness, size of plate wall blocks required, state if face to be rough to receive skimming, or to have smooth finish. Mention who has to supply the necessary centring for floors.

Folding Partitions.—Submit specification, plan, and elevation. Mark clearly on plan the width of the room between finished face of walls, and also height from floor to underside of beam (if any). State whether wood or iron beam and width of same on soffit. Give number of leaves (or divisions) and mark position of any door required. Give particulars of any hot-water pipes, skirtings, dadoes, corbels, or other projections which may appear on walls. State if price includes delivery, fixing, priming, painting, varnishing, glazing, and necessary ironmongery.

Foundation or Memorial Stones.—To be best white

Portland (or other stone), free from shell or other defects. Give dimensions and details of lettering, and state if sunk or raised letters required, etc.

French Polishing. See Polishing, page 142.

Galvanised and Riveted Air Tubing for Roof Vents.—

State gauge of iron, give figured sketch showing exact lengths, heights, diameter, and pitch of the tubes, with particulars of all bends, elbows, junctions, etc. When giving diameter of bellmouth bottoms, show width of flanges with particulars for any regulation valves required.

Galvanised Wire, Window, and other Guards, etc.—

Give over-all sizes, with particulars and sketches of any shaped heads, state gauge of frame, vertical wires, and cross-bars, also size of mesh, and if straight lattice or diamond corrugated lattice required. (The mesh is measured across the width.) Stipulate the width between cross-bars and mention that all galvanising to be done after guards are made. The cross-bars and frame should always be three or four gauges stronger than the vertical wires.

Gas Service.—Submit Specification and detailed Schedule also plan showing all points, etc., marked as for electric service. Give diameter of gas main to be carried from Gas Company's main in the road to meter. Mention if digging is to be done by the Contractor.

Gasfitting (internal).—Give particulars and number of pendants, wall brackets, etc., also the height they are to be fixed from the floor line. All fittings to be "selected," or equal to samples submitted. Stipulate "Test all gas-pipes and fittings, and leave perfect at completion, or to the satisfaction of the Architect and local Gas Company."

Glass.—Give particulars and sizes of the various kinds of glass required, and sketches of any cutting to shape needed. Where there are several blocks of buildings or large floor areas, etc., and it is convenient that each lot be kept separate, instruct manufacturers to send on glass in separate crates, clearly marked, such as "First Floor, Block A," etc. For rough rolled glass or patterned glass it is necessary to specially mention the height and width, also which is outside or inside face when shaped squares are required.

Glazed Tiles.—State size, thickness, quality, colour, and finish, and whether to have "keyed" back, etc., also if interior or exterior angles required, and whether stops to be

handed, etc. These remarks apply also to skirtings, dadoes, beadings, etc.

Glazing (Labour only).—Give schedule of the glass which will be delivered by the Contractor "ready cut" to sizes. State if wood or iron sashes, etc. Positions for glass should also be mentioned on schedule such as "Windows, ground floor," "Doors, first floor." State if glazier has to pay all his own expenses, and supply putty and all necessary pegs or sprigs. Stipulate that the back putty to be cut off and left thoroughly clean, and all to Architect's satisfaction. Make special mention of any old glass which has to be hacked out and replaced with new.

Granolithic Work.—Give detailed specification and plans, with particulars of any cavetto skirting, angles, borders, etc., required. Mention if water, etc., to be supplied by Contractors, and also state who has to do cutting of chases ready to receive any granolithic steps, who supplies timber for centring, casing, etc., and also who performs haulage of materials to site. Stipulate that all indoor work in floors to be laid to falls as shown on the plan or to required levels. Include any guarantee for the work required under the contract.

Gulleys.—Give shape (P. and S.) and diameter of traps and size of tops. If galvanised and hinged locking grids, also if any particular maker's goods required.

Hardwoods.—See Timber.

Haulage.—Mention any agreed day-work prices for one or more horses, or one or more motor lorries, etc. Give schedule of prices, "station to job," or from or to any other point. Be explicit as to the price being per ton, per load or "per thousand," etc., and whether station weight to be accepted as a basis for charges. Contractor to be indemnified against claims for railway demurrage charges, accidents to haulier, workmen, horses, carts, trollies, or any attendant risks. State clearly what assistance in handling will be given by Contractor's men for special material such as glazed and special bricks, tiles, slates, drain-pipes, dressed stone, steel girders, etc.

Heating.—As this work is usually covered by a prime cost item, the general remarks under the headings of "Electric Service" and "Gas Service" are applicable here.

Ironmongery.—See special article, page 66.

Iron Joists, Girders, Stanchions, etc.—See Ironfounders and Smith, page 76.

Iron or Steel Sashes.—Give thickness, and section of sash bar, over-all sizes, and number of sashes required, also sketches of any shaped heads, mullions and transomes. Avoid misunderstanding by definitely stating the number of panes required to each sash, also state which portion (if any) to open, and if to be hung on centre, side, bottom, or top, also whether to open out or in. Give details of all opening gear required. Mention if sashes to have screw holes for fixing to wood plugs or lugs for building into walls. Sprig holes also to be drilled ready for glazing. Sashes to be thoroughly watertight and painted one coat and delivered all ready for fixing.

Iron Stove Tubing.—General remarks under “Galvanised air tubing” apply here also. Add particulars of cone caps for top of tubing, and also cleaning door. Stipulate to be “smoke proof” when completed.

Lead.—Give width of “sheet” lead required and weight per ft. super, and for “pipe” lead give diameter and weight per yd. lin.

Leaded Lights.—Order according to approved design and specification submitted with quotation. Give full-size paper or cardboard templates for any special shaped work. “Sight sizes” and designs should always be submitted with clear instructions as to how much has to be added all round for rebates. Mention that all necessary saddle-bars or steel-cored cameos be supplied, see also note in Glazier, page 92.

Lettering and Gilding.—State colour, character, and size of letters, if shaded, etc., number of coats, and particulars of finish, also if on wood, stone, or glass. For gilded letters add quality of goldleaf, state if sunk or raised letter.

Lightning Conductors.—Follow specification and furnish drawing, giving exact path of conductor and where the points have to be fixed, also sizes, lengths, etc., of copper elevator, rod and terminal point, copper tape, earth plate, gun-metal holdfast, etc. State depth conductor has to be buried in the earth. Excavation for earth plate to be done by Contractor.

Lime.—State that the same has to be forwarded in covered vans or sheeted trucks as a protection against wet weather, etc.

Man-hole Covers.—State size and design, and whether

heavy, medium, or light, also whether hinged or lift-off covers. Give particulars of any locking arrangements, and if to be coated with Smith's solution. When special quantity ordered, have Contractor's name and address cast on the covers.

Mortar.—State if ordinary mason's, fine bricklayer's, plasterer's, wall, or ceiling mortar required, also that all to be well ground with plenty of lime. State price per ton, per load, or per yard, cube.

Mosaic and Terrazzo.—Before ordering, ascertain the exact thickness the cement floating has to be left below the finished floor. State if the mosaic is for floor or wall, and give particulars of the quality and design to be worked, also of borders, cavetto skirting, angles, stops, etc. Include any guarantee required under the contract. Keep particulars of floor and wall-work separately.

Mouldings, Skirtings, etc.—Send full-size sectional drawings of mouldings required, retaining duplicates for reference. State that the mouldings are to be made out of clean, bright, red deal, free from sap on face, large, loose, or dead knots, and other defects. State the lengths mouldings are required or that they must be supplied in fairly long lengths, all to be clean stuck from the machine or hand-finished as the case may be. In case of sash stuff, stipulate that it is imperative that all the moulds must be run in the same order to avoid trouble in fitting the bars, styles, transomes, etc., together.

Nails.—It is not generally realised that there is a considerable difference in the weight of many makers' cut nails. Some have a greater number of nails to the hundredweight than others, without affecting the quality. It is, therefore, obvious that on a large order a big saving can be effected by choosing an economical nail. Nails are sold by manufacturers on "basis" prices list, with "extras" for special sizes.

Painting and Paper-hanging.—Follow specification and quantities with any necessary adjustment. All to be done to the Architect's satisfaction. All tools and plant to be found by painter. Building Contractor's scaffolding to be at his disposal where required.

Patent Glazing.—Give figured plan and section of glazing and particulars of glass and full-size section of bar required, width of centres for bars, particulars of any skylights and

opening gear for same, details of lead flashings required. State that absolute watertight job must be given, also include any guarantee required under the contract.

Pavement Lights.—Give over-all sizes, particulars of C.I. frames, if fixed or to open in two or more leaves, state width of flange required all round for stone curb, stipulate quality, size, and shape of glass lenses, and particulars of any ventilating panels.

Paving.—State thickness and gauges of stones required, or width of courses, and if self-faced or clean dressed, and also whether to be jointed ready for fixing, etc.

Plumbing.—Follow Architect's Quantities and Specifications, with any necessary adjustments, and state whether the various items to be "fix only" or "supply and fix." Give separate weights of the various thickness of lead pipe, sheet lead in soakers, valley and gutter flashings, and step flashings. State that all is to be executed to Architect's satisfaction. All old lead removed in the progress of the work to be the property of the Contractor.

Pointing.—State quality and kind of pointing required, such as mortar in cement and sand and portion in black mortar, all flushed in and struck off with trowel as section shown on drawing enclosed. All joints to be first well raked out. Mention if on brickwork or stonework, and price per yard super. State period allowed for completion of work, Contractor finding all material and scaffolding necessary.

Polishing (French).—Give particulars and superficial and lineal measurements of work required to be executed, woodwork to be all properly cleaned off, stained, and well bodied in, and French polished, polishing to be all rubber work, not brush work, and finished off to approved sample tint with best material and workmanship.

Railings and Gates.—For railings give design, length, height, and full specification, including sizes of iron rails, bars, standards, stays and earthplates, centres for rails, etc., also details for any ornamental panels.

For gates give similar details, with additional particulars of any locking and fastening arrangements, also particulars of pillars and gate stops.

Gates and railings to be painted one coat before delivery to job. State who has to do the fixing (see page 79).

Rain-water Goods.—See page 77.

Ridge and Hip Crests.—Give pitch, state if plain, lapped, or ornamental, include all mitres, junctions, terminal pieces, and finials.

Roof Ventilators.—Give design, state height, diameter of head, and size of base, and ventilating pipe. Give correct pitch of roof, mention if material to be copper, zinc, or galvanised iron, and if to be painted before delivery.

Slatework.—State if plain, sanded, sawn, or enamelled slate. Give length, width, and thickness of divisions, number of slabs required, and if joints are to have rebated edges. Mark positions of any countersunk screw holes (see also Blackboard).

Slating and Roof Tiling.—See page 71.

Sliding Partitions.—See Folding Partitions.

Steel Sashes.—See Casements and Iron Sashes.

Stone.—Stone is often required “Rough,” “Sawn,” or Dressed (see Dressed Stone).

Stone Steps.—Give exact lengths required, also width, depth, and finish, and if back-jointed.

Terrazzo.—See Mosaic.

Terra-cotta.—Submit drawings and details, giving colour and quality, also quantities of the cube contents of plain, moulded, and enriched work. The whole to be supplied free from fire cracks, flaws, and blemishes, to be of an even colour throughout, equal to samples submitted, truly worked to details. Allowance must be made for necessary grooves, joggles, perforations, mortices, etc., before burning the terra-cotta. No chippings or other interference with the fired surface of the material will be allowed to any exposed faces. Price to include all models, moulds, etc., necessary for the manufacture, and also all suitable packing and carriage to receiving station in a covered van or properly sheeted trucks. State which portion of order is first required, and also stipulate that each piece is to have an identification mark as shown on fixing plan, to facilitate fixing, as in the case of dressed stonework.

Timber.—Whenever possible, select timber from actual stocks at timber yards. For joists, rafters, etc., specify good building red, free from excessive sap, give length, etc., required. For joinery, specify good, suitable clean red, equal to second or third Archangel red, or equal thereto, in long lengths. State brands, when imported, and if under sheds. For flooring

and matchboards specify width and thickness, squared edged, V-jointed, or beaded, wrought single or double faced, mention if red or white required. All to be free from sap on face, large, loose, or dead knots. Timber sent ex railway truck should be sheeted.

Hardwoods.—State to be good sound, prime quality and thoroughly bone dry. Give length, thickness, or width, fairly clear of sap and waney edges and mention if from saw, or planed one or two faces, no heart planks allowed. State if timber required for Church or Bank Fittings, Counters, etc., so that merchants can more thoroughly anticipate requirements. Order well in advance to give ample opportunity for seasoning. Pitchpine roof timber of large dimensions should be selected from the driest and best seasoned bulks obtainable.

Tiles.—See Glazed Tiles.

Tile-laying (Labour only).—Accept quotation at price per yard super for fixing “wall” or “floor” tiling (state quantity and description of tiles) as per details submitted. Fixing price to include all the necessary cutting, mitres, angles, stops, capping, beadings, etc., and also all labour and expenses connected therewith. Mention time for commencement and completion of work. Once the work is started, no cessation of operations to be permitted until the whole work is completed. All to be done to Architect’s satisfaction. Contractor finding cement for fixers.

Walling Stone.—To be good, flat, bedded stones. Order on “large” stones for foundations and “medium” ones for ordinary walling.

White Lime.—To be best hand-picked and despatched in either covered van or properly sheeted railway trucks.

Window Cleaning and Washing Floors.—Give instructions to clean all glass in windows, doors, etc., both inside and outside, wash and thoroughly scrub all floors. Price to include all labour, materials, and appliances, and to do all to Architect’s satisfaction.

Window Guards.—See Galvanised Wire Guards.

Woodblock Flooring Parquet Flooring, and End Grain Block Flooring, etc.—Enclose detailed plan showing exact particulars of spaces to be covered, give superficial area, size and thickness of block and boarders required. To be laid in approved damp-proof, mastic. Specify if to be rift sawn, and dovetailed, and also entirely free from sap, whether to

be laid herring-bone or other pattern. Price, of course, to include all necessary cuttings, floor to be properly planed and well cleaned off and wax polished at completion. Blocks not to be sent to the job loose, but in bags or properly tied-up bundles and "carriage paid." Insert that although all proper and necessary precautions will be taken by the Contractor, the onus is placed upon the subcontractor to satisfy himself before proceeding with the laying of the floors that the floating is in a perfectly dry and fit state for him to do so, and thus avoid any question which might afterwards arise on that score. Ask for a sample block well in advance in order that the general foreman may arrange the cement floating to the exact depth from the finished surface of wood-block floor. State definitely terms and conditions of payment, and include any guarantee required under the contract. The laying of the floors to proceed without intermission unless otherwise arranged.

CHAPTER XXXII

SUBCONTRACTING

By subcontracting we usually mean the letting out to specialists of certain classes of work which are part of the general contract, but are governed by the Architect in prime cost or provisional amounts or contingency items, the Contractor simply acting as the channel through which the Architect's orders are to be carried out. Subcontracting is not altogether an unmixed blessing to the general Contractor. The procedure under provisional and prime cost items clauses often makes the Contractor responsible during the maintenance period for the efficiency of work done or materials supplied by the specialists. The Contractor should not be responsible directly or indirectly for any provisional or prime cost item if he has no control over it, and a clause to this effect should be inserted in his contract. In placing orders of this kind the Contractor should strictly impose the retention period clause on subcontractors. Many specialists and manufacturers take strong objection to such terms, but if the Contractor is wise he will, for his own peace of mind and security, insist on it being fully recognised and confirmed before allowing them to proceed with the execution of the order. Moreover, he will also abstain from paying them in full until he has received the Architect's certificate specifically stating that the work in question has been executed to his satisfaction.

All beneficial terms, such as trade or cash discounts, should be clearly embodied in an order. It is naturally assumed that every Contractor anticipates a certain amount of benefit under subcontracting work, as he not only acts as medium in issuing and supervising the Architect's orders, but also pledges his credit for the value of the work so ordered, and for such services it is not unreasonable to expect that he be amply recompensed. Subcontractors should be made to take all particulars and dimensions on the job necessary for the due performance of their work.

In addition to general subcontracting mentioned above

there is another class of subcontracting, usually termed subletting, which is entirely controlled by the Contractor, namely the subletting of labour or labour and material for slating, plastering, plumbing, painting, heating, etc. The terms governing orders for this class of work are the same as those which apply to ordinary business orders, and which are fully dealt with on page 133.

Unless otherwise stated subcontractors' estimates should cover the provision of all labour, material, and plant necessary for the due performance of their work, but experience teaches that when they are on a job the Contractor has to guard against several impositions. We have already dealt with this matter on page 34, and repeat that if the Contractor does not keep a sharp look out, he will find himself the victim of a good many items of expense which are really no concern of his. His foreman should be instructed to keep a strict account of any special assistance given subcontractors, and an account should be subsequently rendered for the same before the settlement of the subcontractor's account. If possible obtain the subcontractor's signature for the assistance rendered to him.

The chief failings or shortcomings of subcontractors are :—

- (1) Sending materials and plant to the contract "carriage forward."
- (2) Consigning heavy traffic direct to the contract, thus throwing the responsibility for the carriage cartage and general handling of the same on the general Contractor's shoulders.
- (3) Sending tradesmen to a job without the necessary complement of labourers with the hope of obtaining gratuitous assistance.
- (4) Starting the work with insufficient material and plant, again in the ardent hope of the deficiency being made good by the long-suffering general Contractor.
- (5) Making prolific use of the Contractor's hoists, cranes, etc., *ad lib.*, also water supply, etc.
- (6) Sending goods to the job before required, often when there is no room or convenience to receive them, thus necessitating unnecessary handling by general Contractor. Impromptitude in starting their work, delays during progress and often entire suspension of work caused by the withdrawal of workmen to other jobs.

- (7) Leaving their plant or surplus machinery on the job after completion on the off-chance that the benevolent building Contractor will relieve them of the responsibility and expense of hauling and despatching same to the station, and attend to the necessary labelling and consigning of same.

All these trifles spell £ s. d. to the Contractor, and as the small things count these parasitical tendencies of subcontractors should be ruthlessly guarded against. Foremen are often very easy dupes to their wiles and should be warned against them.

It is essential to the Contractor's interest that he properly supervises the work of all subcontractors, whether governed by the Architect or himself, and also makes a thorough inspection of the same before it is finally left as complete. We will illustrate our point.

On a recent contract a fireproof floor contractor should have properly levelled off the top of his concrete floors at a point which would have allowed the general Contractor one inch only for his cement floating for wood-blocks. Through careless and indifferent workmanship the average depth left for the floating was $2\frac{1}{4}$ in. The general Contractor was simply allowed under his schedule 1 in. for floating, and as the floors covered a large superficial area, the reader will readily realise what would have been the loss to the Contractor on the working cost of this floating, had he not insisted on obtaining an extra order from the Architect for executing the additional $1\frac{1}{4}$ in. necessary before proceeding with his work.

If there are any apparent discrepancies or defects in subcontractor's work when they are about to leave the job the attention of their foreman or leading hand should be drawn to it and the complaint confirmed by letter as well, so that the subcontractor be given every opportunity of righting the matter forthwith.

CHAPTER XXXIII

CEREMONIES

THERE is usually a ceremony of some kind or other arranged for in connection with new public works, such as foundation-stone laying, formal opening of the building, etc. On these occasions the Contractor has to meet certain contingencies which are often not provided for in the usual Bill of Quantities. Special enclosures, stagings, and platforms have to be made. Presentation keys, trowels purchased, etc. Contractors are usually approached by the Architect or some official to arrange matters for these special occasions, but often there is great reticence as to the manner in which the expense has to be met, and as to the proportion the Contractor is expected to bear. The Contractor should come to a perfectly clear understanding on the point with the Architect. The original purpose of these ceremonies has, of course, no interest to the Contractor, but he should, nevertheless, not fail to make the best use of them to further his business connection.

A progressive Contractor would make good use of the occasion by having an attractive illustration of the building and also a report of the meeting inserted in local papers, not omitting to dwell a little on his own firm and its past record.

CHAPTER XXXIV

DEMOLITION OF BUILDINGS

GREAT care and foresight are required in regard to the above. It is practically a special branch of its own, and there are many firms who do nothing but this class of work. Nevertheless, it often falls to the lot of an ordinary Building Contractor to deal with the demolition of buildings in connection with their general building. There is a great element of speculation about it, and when tendering it is wise to endeavour to keep on the safe side.

The chief points for consideration apart from the labour aspect is the commercial value of the material which can be salvaged. Such items as old lead, sheet and pipe, steel girders, timber, slates, etc., are often a very fruitful source of revenue. Prior to commencing demolition work the Contractor should obtain proper insurance cover for the work in respect of the Workmen's Compensation Act, i.e. unless his existing policy already covers the risk.

CHAPTER XXXV

HAULAGE OR TRANSPORT

THE general subject of hauling has already been surveyed on page 39, and the method to be employed in keeping accounts for the same is described on page 255.

Our object in this article is to examine transport from an economic standpoint. The transport problem invariably confronts every Contractor, and unless it is judiciously handled often proves unremunerative.

The haulage of heavy material is now almost entirely done by motor transport, which is gradually but surely displacing the horse and cart for the bulk of Building Contractors' work. The following remarks therefore apply in a general sense to both systems.

Each driver should have his day's work properly mapped out for him. He should not be kept waiting for material or assistance in loading and discharging. Arrangements should be made to give him quick despatch on all occasions. Transport is an expensive item, and delay means loss. If a vehicle has to be sent to some out-of-the-way place, endeavour by all possible means to make up or obtain a load for the return journey. One of the advantages of keeping a mortar mill going is that a load of ashes is always acceptable and can usually be obtained for the mill for the return journey even if nothing else requires hauling. A list should be kept in the office on which all odd jobs for the cart should be entered. These can be attended to from time to time when opportunities present themselves, or when a slack day sets in.

Economy can often be effected by the use of a spare cart or lorry. For example, a driver's last load for the day may consist of glazed bricks, tiles, or similar material which requires careful handling, and should therefore occupy some little time in unloading. His first load out the next day may be a load of small mouldings and sundry delicate bank or other fittings, etc., which also take considerable time to be properly

loaded. These fittings could be loaded up overnight on a spare trolley and put ready for the driver to start off the first thing in the morning, otherwise he would be compelled to occupy his time in both unloading the bricks, tiles, etc., and loading up the fittings. It must not be overlooked that primarily a driver's job is "transport of material," and any device which can be adapted to effect economy of time in regard to loading and discharging should be adopted.

A strict account should be kept of each driver's movements, no opportunity should be given for slackness. Leniency is too often taken advantage of. It should be ascertained what are the recognised local working hours for drivers, and they should be reasonably observed by both the "contractors" and "hired" vehicles. The tendency to start later and finish earlier than the recognised hours has become only too prevalent. A fair day's work should be expected and given. It should also be seen to that the Contractor's horses are well looked after. The loss or permanent damage to a horse can often be attributed to wilful neglect or ignorance on the part of its driver. Hauliers arriving at the stable late in the morning and making up the lost time by rushing the horse out without a feed or proper grooming is one of the many instances of neglect which occurs to the writer. Attention should be given to the quality as well as the quantity of horse food. The chief point is to employ a thoroughly experienced man who understands well the nature of the animals he is expected to look after. A good sound animal can as easily be spoiled by under- or over-feeding, bad grooming, etc., as by over-working. Attention should also be paid to the proper shoeing of horses. Only a good smith should be employed.

When the Government issued its rationing order during the late war in regard to forage for horses it published the following table, which may be found of service to the reader. It should, however, be mentioned that the list errs considerably on the lean side, and has been found not to be practical where a good hard day's work is expected.

Note.—(a) Heavy dray and cart horses and trotting vanners. (b) Light draught horses and light trotting vanners. (c) Other light horses and cobs. (d) Ponies 14 hands and under. (e) Racehorses registered with Controller of Horse Transport. (f) Stallions used exclusively for stud purpose. (g) Bulls.

(h) Milch cows. (i) and (j) Other animals, description to be given.

COPY RATIONS ORDER,

No. 897.

EXPLANATORY NOTE.

The Maximum Daily Rations of Chaff must consist of two-thirds of Hay and one-third of Straw of the following proportions.

CLASS.	MAXIMUM DAILY RATION OF CHAFF. lbs.
(a)	16
(b)	14
(c)	9
(d)	7
(e)	8

	HAY. lbs.	STRAW. lbs.
(a)	$10\frac{2}{3}$	$5\frac{1}{3}$
(b)	$9\frac{1}{3}$	$4\frac{2}{3}$
(c)	6	3
(d)	$4\frac{2}{3}$	$2\frac{1}{3}$
(e)	$5\frac{1}{3}$	$2\frac{2}{3}$

Note.—Pit-horses and ponies working in the pits or at the pit-mouth may be given 2 lbs. of chaff extra per day.

A Contractor's horse, being usually of a heavy class, needs plenty of good food in order that it may satisfactorily perform its work. A sufficient weekly amount would be $2\frac{1}{4}$ to $2\frac{1}{2}$ cwt. of provender, made up as follows :—

$$\left. \begin{array}{l} 2\frac{1}{4} \text{ cwt. chopped feed.} \\ \frac{1}{4} \text{ cwt. bran.} \end{array} \right\} \text{or} \left\{ \begin{array}{l} 1\frac{1}{4} \text{ cwt. chaff.} \\ \frac{1}{4} \text{ cwt. bran.} \\ 2 \text{ bushels crushed oats.} \\ \frac{1}{2} \text{ cwt. hay.} \end{array} \right.$$

It often occurs that a Contractor finds he is not able to keep all his horses fully employed for a period owing to slackness of work, etc. If the prospects of renewed activity are remote the most economical plan is to sell the horses, as a horse confined to stable is hardly a paying guest. Should, however, there be hopes of an improvement within a short period, the Contractor could with advantage hire his horses or take on haulage contracting for a time, as there is usually plenty of this class of work obtainable. A list should be kept of all firms likely to require hauling who could be approached at slack periods. Large hauling contractors, railway companies, builders' merchants, and others are often glad of assistance. The stables should be well ventilated and carts and trollies kept dry when not in use.

Some further remarks on transport will be found on page 254.

CHAPTER XXXVI

MACHINERY AND PLANT

CONTRACTORS have of necessity to make use of various kinds of machinery, some of which mean a big expense, both in regard to "initial" outlay and "general upkeep."

These two items must therefore be well considered when contemplating purchases. In order to keep abreast of the times all available information with regard to similar machinery used by other contractors should be obtained before committing oneself to the purchase of any particular type of machine. When considering the purchase of machinery, the following motto (applicable to all classes of machinery and plant) should not be overlooked :—

"Be not the first by whom the new is tried
Nor yet the last to lay the old aside."

Again, when making an investment in machinery endeavour to get something that is

- (1) Safe, sound, serviceable, and not unwieldy.
- (2) Saleable and
- (3) Unlikely to depreciate much in value.

When purchasing or selling second-hand machinery it should be clearly understood who has to bear the cost of overhauling, railing, or removing same, and whether any fittings, tools, etc., are included in the bargain. These items are usually costly, and therefore should not be overlooked during negotiations.

Again, in the purchase of second-hand machinery care should be taken to ascertain whether the makers of same are still in business. If they are not, the question of spare parts and replacements becomes a serious and costly one and may considerably outweigh other points which may be advanced in favour of the machinery.

In deciding which is the most economical and serviceable motive power for working machinery in joinery works the question naturally arises as to whether steam, oil, town gas, suction gas, electric, or other power should be used. Each holds an advantage under specific circumstances, and there-

fore all demand full consideration. Then again, with regard to the purchase of portable engines for outside contracts, sometimes it is preferable to have a small engine rather than a large one, but, whether large or small, the quality should be of the best, the best article being the cheapest in the long run.

Where financial circumstances make it necessary to have a very limited number of machines for joinery work care should be taken to purchase only the most suitable for general purposes, which include the newest ideas, suggestions, and methods of production. The ruling principle that should govern the selection of machinery for a joiner's shop is the elimination of all hand processes or benchwork to the very lowest point possible.

In a joiner's shop a circular saw, rip saw, bandsaw, boring- and chain-cutting morticing machine, mitring and trimming machines, and surface planer are almost indispensable; as also is the vertical spindle (with elephant recessing attachment and also a French head attachment for preference), by which all kinds of rebating and moulding for sashes and frames, doors, church seats, etc. (straight and circular), can be worked, as well as handrail, drop mould, band mould, matchboards, wood blocks, etc. A tenoning machine is also very serviceable. With it tenoning and scribing for sashes, doors, and frames, housings for fittings, frames, halvings, joints, etc., can be executed. A "Cowley" rapid trenching and moulding machine is also an invaluable adjunct to a large joinery workshop; it is specially designed for all kinds of trenching, circular moulding, slot morticing, etc. An emery wheel is a practical necessity for any fair-sized joiner's shop.

If a large quantity of joinery is constantly being manufactured, the following additional machines are often to be found in use:—

- Trenching, shaping, recessing, and moulding machine.
- Fret-sawing machine.
- Wood-turning lathe.
- Four-cutting moulding machine.
- Rack bench.
- Double deal frame.
- Rope-feed bench.
- Cross-cut saw.
- Sand-papering machine.
- Automatic knife-grinding machine.
- Automatic bandsaw sharpening and setting machine, etc.

Where there is a quantity of belting a considerable saving of time is effected by the introduction of one of the many patent belt-lacing machines on the market. Belts have so frequently to be repaired that the old-fashioned way of rejoining and putting on belt fasteners is certainly not the most economic. Belt lacers, such as the "Clipper" and others, soon pay for themselves, apart from the fact that the method is a more expeditious and satisfactory way of doing the work. The careless use and neglect of belts often proves a very big expense to some firms. Most belts require a little dressing applied to them occasionally to act as a preservative; unnecessary tightening and straining are amongst the primary causes of the short lives of many belts.

At the various contracts there are usually numerous kinds of cranes, hoists, winches, etc., needed for the due performance of work, but it is only by practical experience and observation that the most economical selections can be made; much depends on the size and class of work to be dealt with.

Machinery should be overhauled at certain periods. Neglect in this respect often causes great risk and expense. Work of this nature is usually undertaken at stock-taking time, holidays, and slack periods. Some machines depreciate in utility and value quicker than need be for want of proper lubrication. This is a point shop foremen should not neglect.

In the case of stone-crushers it is advisable to keep a pair of jaws always in readiness, in case of breakage. Whenever possible get a sectional drawing of the working parts of all crushers in use, so that should any breakage occur the maker's works can be immediately wired for a replacement of the particular part needed. Many makers issue such drawings, giving a distinct number or letter to each part of the machine, in order to obviate mistakes when ordering.

A word of warning should be given in regard to the stowing away of machinery or plant when not required. Proper watertight sheds or buildings should be provided and all machinery left well cleaned and oiled in readiness for future use.

In conclusion, it is well to mention that it is most important that all possible steps be taken to comply with the Factory Regulations in regard to the supply of proper protection and guards to machinery for the prevention of accidents to workmen.

CHAPTER XXXVII

ARCHITECTS' CERTIFICATES

WHEN an Architect wishes to arrange for a payment to be made to the Contractor, on account of work done, he issues what is termed a certificate, which is practically a demand upon the Building Owner for payment of a specific amount to the Contractor.

Payments are usually made at certain stages, according to the terms of the contract. It is, however, customary for architects to place upon the Contractor the onus of proving the amount he considers due to him by demanding an approximately full priced-up statement of work executed to date, and, as a consequence, contractors render statements to architects whenever they consider they are entitled to a draw. For obvious reasons it is to the interest of a Contractor to draw upon his contract at all times as much as he is legitimately entitled to.

If a Contractor has several contracts running concurrently he will find it convenient to keep constantly before him a list of certificates applied for, as a reminder, as some architects require a considerable amount of following up before the desired "scrap of paper" can be extracted from them.

The following are amongst the principal items that require attention when preparing a statement for certificate purposes:—

- (a) Debit the total value of work executed, and Architect's fees.
- (b) Debit the total value of extra work (if any).
- (c) Debit all extras on schedule for advance in wages and material (if any).
- (d) Debit value of plant and material on site, if allowable under the contract terms.
- (e) Credit retention amount (except in final statement).
- (f) Credit all cash received on account of the contract.

"Statements" should be made up by persons fully acquainted with the contract under consideration. It is not a

ARCHITECTS' CERTIFICATES

Folio.	yds. ft.	No.		£	s.	d.
			Total amount of contract			
			Approximate cost of extra work to motor garage, as per details			
			already supplied			
			<i>Advance in cost of Materials—</i>			
			10 tons cement	8/-		
			15,000 common bricks @ per 1000	10/-		
			20 squares flooring @ 6/-	—		
			Mortar, 40 yds.	3/6		
			<i>Advance in Wages—</i>			
			Trades . 2400 hours	3d.		
			Labourers . 3000 "	3d.		
			Hauliers . 180 "	3d.		
			As per details already rendered.			
			Plus 10% profit			
				94	5	0
				9	8	6
				103	13	6
			<i>Less items still to complete—</i>			
			Terrazzo floor	32	10	0
			Wood-block floor	49	5	0
			Doors to hang	2	10	0
			Hat rails	0	15	0
			Pipe casing	2	5	0
			Electric light provision	68	10	0
			Contingencies	50	0	0
			Ironmongery say	63	0	0
			Lead-lights	15	10	0
			Painting, to complete say	45	0	0
				329	5	0
			<i>Less Retention amount</i>			
				39	8	6
				500	0	0
				34	8	6
				2500	0	0
				984	8	6
			Total amount previously certified			

very difficult matter to work up a statement if done on systematic lines. The most methodical and expeditious way to proceed is to take the Bill of Quantities as a basis. This can be done in two ways, each commendable under different circumstances.

The "first" method (see example on page 158) is to include in the statements all items (or portions of items) mentioned in the Quantities that have been executed; and the second (see page 109) is to take the contract amount and deduct therefrom all items (or part items) that have not been executed. "Extra" work should be added whichever method is adopted.

The first method is more adaptable for the rendering of accounts in the early stages of a contract, and the second for the closing stages. In our notes on the Contract Account Book (page 265) directions are given for recording deviations. This book should invariably be referred to when making up statements, to avoid items being omitted. Accounts for extras should only be "approximate" ones until the final account is rendered, i.e. unless estimates have been given for them. By this method of including extra work items in the statement the Architect will be diplomatically reminded of their existence. They will not come as a surprise to him when the final account (see example, page 161) is presented.

A Contractor is often requested to pay in full prime cost items or subcontractor's accounts, but he is not obliged to do so under his contract, unless the Architect has fully included them in his certificates, as such items are, of course, subject to the same amount of retention as the Contractor's general work.

Again referring to our example (page 159), we should mention in regard to item £94 5s. for extra cost of wages and material, that the clause suggested on page 130 was a condition of the contract given in our example. The item £9 8s. 6d. for "Contractor's profit" may be included, but the claim may not always be successful.

The "extra wages" clause applies equally as much to labour performed for the furtherance of the contract "off the site" (such as hauling, making joinery, plumbing, electrical work, etc.) as work carried out "on the site." This is a point often overlooked when making up "extra wages" schedules.

When starting a contract for public bodies or private firms, who make their payments at certain fixed dates, enquiries

THE NATIONAL STANDARD DEPOSIT BANK CO.

To SURREY AND KENT, Contractors

Folio in quantities	Final Account	Deduct	Add
		£ s. d.	£ s. d.
	To Contract Amount	—	10950 0 0
3	Deduct contingency item	250 0 0	—
	Add strong room, as per estimate	—	215 10 0
4	Deduct provisional amount for alterations, etc., to old bank fittings	300 0 0	—
	<i>Add as executed :</i>		
	Altering and adapting swing doors, etc.	—	35 0 0
	Making new side panelling and fixing	—	15 10 0
	Altering front counter	—	10 5 0
	Extending back counter	—	25 7 6
	Repolishing counter screens, etc.	—	21 0 0
	Repolishing and relacquering brass fittings	—	7 10 0
17	Deduct provisional amount for electric light	272 0 0	—
	Add, as executed, Amery & Co. account	—	245 10 0
15	Deduct p.c. items for general ironmongery (see list)	175 10 0	—
	Add ironmongery supplied (see list)	—	215 5 0
18	Deduct sanitary fittings, p.c. amounts	125 0 0	—
	Add sanitary fittings as supplied (see details)	—	118 10 0
	<i>Add sundry items :</i>		
	Desk for manager's room, as estimate	—	16 10 0
	Press stand in general office, as estimate	—	12 10 0
	Pass book cupboard, as estimate	—	9 10 0
6	Variation re concrete floor in ante-room, etc.		
	Deduct amount allowed in quantities	80 13 0	—
	<i>Add as executed :</i>		
	94 yds. super, excavate 6" deep and remove, 2/6	—	11 15 0
	94 yds. 1" cement floating, 3/6	—	16 9 0
	94 yds. 4" cement concrete, 4/6	—	21 3 0
	94 yds. wood block flooring, 18/-	—	84 12 0
	Add 132 ft. lin. Keene's cement angle, 1/6	—	9 18 0
	„ 34 meters and stops, 3/-	—	5 2 0
	„ stiffening joists over front of bank	—	25 10 0
	„ Increased wages paid operatives and labourers, as per schedule attached	—	126 5 0
	„ increased prices paid on material, as per attached schedule	—	151 7 6
		£1203 3 0	12349 19 0
			1203 3 0
			11146 16 0
	Deduct cash received on account	—	10000 0 0
			£1146 16 0

should be made regarding their dates, which should then be noted up, so that applications for certificates may be made sufficiently early to enable the Architect to conveniently deal with the Contractor's statement in good time. Another point should not be lost sight of where public bodies, such as colleges, law societies, schools, etc., are concerned, i.e. see that any certificate due is placed before the Finance Committee before any of the long vacations set in, otherwise there will be little hope of obtaining payment before the commencement of the next term.

Business needs hardly appeal to the officials of such institutions. There should be a provision in the contract that interim certificates and the certificate of completion should not be unreasonably withheld, and there should also be the right of appeal to an independent arbitrator in the event of dispute on this point. With regard to the final certificate, three months is an adequate period for maintenance. If, however, a longer period is provided for under the contract, arrangements should be made for half the retention money to be paid at completion, also that interest should accrue on retention money not paid within the period specified in the contract.

CHAPTER XXXVIII

CONTRACTORS' ACCOUNTS, INVOICES, AND PAYMENT OF ACCOUNTS

ACCOUNTS rendered by contractors are "nett" unless otherwise stated. Contractors have, comparatively speaking, few accounts to render, but they are usually for large amounts. The chief source from which information is drawn for the purpose of making up their accounts is the Contract Account Book, explained on page 265.

In drafting a "Final A/C," a definite, well-ordered course should be adopted, based on generally recognised and accepted lines.

By proceeding in this manner a great saving of time and worry is usually effected, apart from the fact that there is less likelihood of anything very tangible being overlooked. On reference to our example (page 161) it will be noticed that, after debiting the contract amount, the following items are dealt with in the order (or as near thereto as possible) as they appear in the Bills of Quantities for the job, etc.:—

- (a) Contingency amounts.
- (b) Provisional „
- (c) Prime cost items.
- (d) Estimates given.
- (e) Sundry items.
- (f) General variations.
- (g) Extra cost of labour and material
- (h) Credit for cash paid on account.

As a final check, the Bills of Quantities should be carefully scrutinised and all items thoroughly gone into, so that nothing be lost sight of.

Contractors usually add 10 per cent profit on all items paid by them on Architect's instructions and which are not included in their original contract.

Further, many contractors consider they are entitled to at least 10 per cent profit as anticipated profit lost on any large provisional and other amounts taken out of their original con-

tract, i.e. unless there is a clause to the contrary inserted in the contract ; and even if there should be such a clause giving the Architect full powers to deal with such items, there is a reasonable and equitable limitation to the Architect's use of such powers in this direction.

When making up the final account for a contract, the items for increased cost on wages and materials previously mentioned must not be lost sight of, if the conditions of the contract allow for same. After a Contractor has rendered his final account he should endeavour by all practical means to obtain as early as possible a satisfactory settlement of the account with the Architect. The suspense experienced by some contractors in regard to the final settlement of their accounts is often very disconcerting.

Again, it is the natural desire of a Contractor to learn the exact financial position of a contract as soon after completion as possible. It is impossible for him to do so until he has agreed upon the final figures with the Architect. Unfortunately, procrastination seems to be a failing of some Architects at this juncture.

Re General Accounts.—A list should be kept of "Sundry Debtors," and any delinquent clients systematically followed up. No firm is thought the better of for giving unlimited credit or time for payment. Modern business competition does not permit of such laxity. When making a special offer to induce a settlement of any "disputed" account, it should be made "without prejudice" and a specific period given for acceptance (see also page 239 *re* Checking Invoices, etc.).

Re Inward Invoices and Payment of Accounts.—In order that the prime cost account book shall be brought up to date as near as possible all invoices should be to hand early in the month following the receipt of goods or execution of work. A systematic follow up should be instituted for all accounts not received within a reasonable time. It can easily be ascertained which accounts are not rendered by examining the order book, as all orders for accounts rendered and checked will naturally have been crossed through.

Notes should be made in the office diary of all accounts subject to special discounts if paid on or before certain dates. It possible, avoid giving bills or promissory notes in payment of accounts.

The accounts of small local tradesmen affecting out-of-town

contracts, such as hauling, smithwork, etc., should be paid weekly or fortnightly, as short reckonings are often essential to retain their confidence and goodwill; in any case, such treatment is most certainly appreciated by the majority of small tradesmen. Apart from this fact, there is less possibility of misunderstanding in regard to charges than if accounts are left to drag on indefinitely.

The payment of general accounts should be prompt and systematic; at least one regular day each month should be set apart for the purpose. On no account should any discounts be lost through neglect in this respect.

It is not always realised how much is annually saved, in the way of discounts, in an ordinary contracting business by prompt payment, and, apart from this consideration, a Contractor with an indifferent record regarding the settlement of his accounts cannot expect to obtain best terms or prompt attention paid to the execution of his orders, both of which are most essential to the welfare of his business.

Payments should be made by crossed cheques, as they are more easily traced. Small items will naturally be paid by petty cash.

A Contractor should not make a payment of any account without first consulting his ledger. In fact, one may even go so far as to say that the payment should also be posted into the ledger before parting with the cheque. This may seem impractical and unnecessary to some, but how often, for instance, has a Contractor paid a subcontractor on the spur of the moment or perhaps at the urgent request of an Architect, only to find later that he has omitted or overlooked one or more of the following items:—

- (a) Credit notes for returns.
- (b) Special cash or trade discounts.
- (c) Previous payments on account.
- (d) Part retention amount.
- (e) Some special concession previously arranged.
- (f) Contra account for work done or carriage paid, etc.
- (g) Claim for breakages on job, etc. etc.

The chagrin of a Contractor under such circumstances can be more easily imagined than described.

CHAPTER XXXIX

DAYWORK

THE method of obtaining details of time and material for day-work accounts will be learned in our prime costs chapter. We will simply consider here the question of charges.

In many towns the local Master Builders' Association have an agreed schedule of prices which they use as a basis for their charges. This schedule is printed and distributed among the members. Such arrangements are usually satisfactory both for contractors and clients, as on the one hand it acts as a preventative for undercutting, and on the other as a buffer for overcharging. The standard agreed upon being considered an equitable one. These schedules usually contain rates for foremen, tradesmen, labourers, haulage, machinery, and use of plant ; also general material, such as bricks, pipes, stone, lime, cement, slates, timber, lead, glass, paint, and ironmongery, and are often produced by contractors as a support for their charges when questioned by architects at the time of settlement of accounts. The alternative methods to the above are, first, to arrive at the prime cost of the work executed and add an amount for trade expenses, and also a percentage for profit on the total, as suggested on page 4, and secondly, to put a value on the work, taking all circumstances into consideration, as well as the financial position of the client.

CHAPTER XL

INSURANCE

INSURANCE plays an important part in the life of an ordinary Contractor's business, and therefore claims our consideration.

This article is not intended to be a technical exposition of the subject, but a practical survey of it from a Contractor's standpoint. Nearly every business man is aware that insurance is a system devised by which he can obtain peace of mind and indemnification against financial loss which might occur as a result of certain risks and contingencies which from time to time arise, and over which he has no control.

When a person takes out a policy of insurance it simply means that he has purchased security in regard to some particular risk.

Insurance is generally undertaken by joint-stock companies, which are divided into two classes, viz. tariff and non-tariff offices. It must not be overlooked that, although he covers a risk, it does not really relieve a policy-holder of liability for third-party claims for good and all. What happens is the insurance company agrees for the liability to be transferred to them. If, however, anything untoward happens to the insurance company, the liability reverts upon the shoulders of the insured.

The insured is the person against whom claims are made and against whom all actions are taken. If an unfavourable verdict is given the insured, and the insurance company goes into liquidation, the insured figures as a creditor, and may be called upon to bear the full burden of the claim.

As security is therefore the essence of all insurance, it is obvious that policies should be taken out only with companies of true financial standing and with irreproachable reputations. There are many companies with scarcely any record and less capital to boast of who exploit the ignorance, credulity, and rapacity of persons by holding out to them attractive policies at practically impossible rates. This danger was

more prevalent a few years ago, after the Workmen's Compensation Act was passed, when the public was exploited by adventurers.

In the circumstances it is very necessary that persons taking out insurance policies should be perfectly satisfied as to the financial standing and record of the companies with whom they propose placing their business, and that they will fulfil their obligations when called upon. This should be the first deciding factor, and the premium a secondary one.

It is particularly to be borne in mind that the best companies do not quote the lowest rates. What one should look for is a fair rate with a first-class company which can give absolute security, otherwise, say in the event of a fatal accident or a permanent disablement under a Workmen's Compensation policy, the liability may fall back upon the assured, irrespective of the fact that he has paid the premiums.

There are numerous kinds of insurances, but the following is a list of those usually associated with the business of a Building Contractor:—

- Fire.
- Workmen's Compensation.
- Third party and public liability.
- Driving accidents.
- Boiler, gas, and electrical plant breakdown and explosions.
- Plate-glass.
- Contract guarantee.
- Fidelity guarantee.
- Motor-cars and vehicles.
- Robbery of wages.
- Burglary and house-breaking, and
- Loss of profits.

We will proceed to consider some of the factors which count in dealing with them. The rates of most risks are fixed and classified by tariff offices, who work under an arrangement by which the general experience is pooled and rates agreed upon. The associating companies agree to charge the same premium for most classes of risk. In some other cases, however, there is a certain amount of discretion and latitude allowed to individual companies.

There are many insurance brokers who specialise in con-

tractors' insurance and often prove of great service to those who seek their assistance.

The phraseology and conditions should be carefully read before accepting them as in order.

When handing a proposal of insurance to any company it is expedient to get a cover note for the risk, pending the issue of a duly stamped policy. This point should not be overlooked.

Fire insurance and other premiums should invariably be paid prior to expiry date. If a fire occurs affecting the policy the day after the last day of grace, the insurer has no "legal" claim on the company. It should be particularly noted that no days of grace are allowed as a rule in the case of insurance taken out for less than one year.

Owing to the steady increase of late in the cost of building it is essential to the best interests of the insurer that he should be satisfied that the amount for which the property is insured is sufficient to indemnify him against any financial loss in case of fire.

When preparing a proposal for insurance the proposer should provide the insurance company with all available information in respect of the risk. Perfect frankness and honesty should be his policy, sharp practice usually recoils on the head of an insurer when a claim has to be made.

The usual fire risks taken up by contractors are :—

- (1) The yard buildings, workshops, and offices.
- (2) The contents, plant stock, and furniture in the above and including property in the open yard.
- (3) Buildings in course of erection.
- (4) Stores, mess-rooms, etc., and their contents, plant, etc., on the site of the buildings in course of erection.

When dealing with the insurance of buildings do not overlook their "contents." Such instances have been known to occur.

Before placing the insurance of premises it is often advisable to procure competitive rates for such permanent insurances as contractor's yards. The buildings and contents are usually of such a varied character as to admit of various interpretations being given in regard to the tariff rate applicable thereto.

An amount should be placed upon each item combining to make up the risk, and rates obtained for them accordingly. If at the subsequent date there should be a change in the

value of any of these items the premiums can, by the above arrangement, be easily adjusted.

A policy is sometimes issued by an insurance company containing an "average" clause. Where a risk is subject to average insurance companies only pay the insured the full amount of damage done in the event of the full value being covered, otherwise the assured must bear a proportion of the loss, thus supposing stock to the value of £2000 is insured for £1200 and damage by fire is done to the extent of £1000, the insurer will not receive £1000 from the company, but only three-fifths of the damage done, viz. £600, as that was the proportion of the value of the goods insured in the first place.

When materials covered subject to an average clause change considerably in value the policy should be periodically adjusted to meet the altered conditions. The adjustments in any case should be made when the renewal premium falls due.

Lloyds issue a policy which meets the special needs of such cases, and is called Lloyds' adjustable policy. It provides that the premium is only payable on the average monthly balance. Full particulars of this policy can be obtained from any of Lloyds insurance brokers and has much to recommend it.

Many contractors are not aware that they can obtain a substantial reduction on the ordinary premiums covering workshops, etc., by adopting sprinkler installation and other fire prevention appliances recommended by insurance companies. The initial cost of the reliable sprinkler system is high, but many effective portable fire extinguishers are on the market at quite reasonable prices, whilst the humble bucket of water is still a valuable safeguard if properly controlled.

Apart from the monetary advantage gained by the adoption of these systems, the Contractor has the feeling that everything has been done on his part to minimise the risk of fire.

Buildings in Course of Erection.—It is customary under contract work for the contractors to insure the buildings which are in course of erection. The policy is usually issued when the roof or other timber work is being fixed, or when some other inflammable material is being built into the work. This insurance, under the pressure of other matters, is apt to get overlooked, therefore it would be a wise proceeding to make a special note of the matter in a diary well in advance. These policies can be taken for periods of from two to twelve months.

The following are the rates usually charged for buildings of good construction ;—

Two months and under, 6d. per cent per annum ; three months, 8d. per cent ; four months, 9d. per cent ; five months, 11d. per cent ; six months, 1s. 1d. per cent ; seven months 1s. 2d. per cent ; eight months, 1s. 3d. per cent ; nine months, 1s. 4d. per cent ; one year, 1s. 6d. per cent.

The minimum rate per cent premium for brick and stone structures is usually 1s. 6d. per cent.

Before issuing instructions for the insurance of any contract it is well, in order to avoid misunderstanding, to be quite clear in regard to the rate at which the risk is chargeable, as a Contractor is sometimes confronted with an abnormally high "short policy" rate owing to the existence of some unsuspected local conditions. This is especially so in congested areas where the insurance rate of adjoining premises usually applies.

As these policies are temporary only, it is advisable that the Contractor notify the Building Owner immediately he has completed his contract, at the same time suggesting that the permanent policy should be taken up without delay.

The contract amount is not always a satisfactory one from which to estimate the insurable value of the building, the cost of such items as excavations, concrete foundations, ferro concrete work, etc., which are not generally affected by fire should be allowed for. It is sometimes very difficult to estimate the time it will take to complete a contract, and it happens as a consequence that contracts are often completed some months before the expiry date of the policy. For unexpired portions of policies insurance companies usually allow a rebate, provided the Contractor agrees to the cancellation of the policy. This point is often entirely overlooked.

With regard to the insurance of builders' sheds, plant, etc., on the site of buildings in course of erection, full particulars should be given on the proposal form. The following list contains the usual items of such insurance :—

Mess-rooms and store-rooms (constructed of timber and covered with corrugated iron roof).

Stock of utensils and tools in same.

Foreman's office (constructed of timber and covered with corrugated iron roof).

Contents of same.

Stables and harness rooms (constructed of timber and covered with corrugated iron roof).

Horses and other contents.

Engine shed (constructed of timber and covered with corrugated iron roof).

Engine and boiler.

Carts, trolleys, or motors.

Timber and material in the open.

Scaffold poles, planks, ropes, etc., used in the construction of the work.

The rate is about 7s. 6d. per cent per annum.

Workmen's Compensation.—This is one of the most important insurances to be affected. A Contractor's responsibilities under the Workmen's Compensation Act are very heavy, and it therefore behoves him to give the matter his fullest consideration when fixing up a policy for this risk. He should endeavour to place his business with a company that has a reputation for dealing with their claims in a fair and business-like manner.

Contractors interested in housing schemes will note that some insurance companies are now quoting more favourable rates for that class of risk than for the ordinary contracting work.

It does not pay a Contractor in the long run to be covered by an office, even a first-class one, that pays its claims too easily or too generously, for there are unfortunately employees (chiefly the less valuable men) who are ready to take full advantage of such circumstances.

A Contractor may take all possible precautions to minimise the risk of accidents on his work and yet have a run of bad luck in the matter of claims.

Possibly none of the claims may be really serious, and yet through unbusiness-like and indifferent handling they may prove costly, and this naturally has a detrimental effect on the Contractor's record. A bad record may mean an increased premium, or, worse still, it may lead to the insurance being declined altogether. It is the duty of the policy-holder to advise his insurance company of any accident, *however*

trivial, immediately it happens, and to be governed in all subsequent proceedings entirely by the insurance company, also to make no admission of liability or payment of money to the injured employee without the approval of the insurance company.

The writer has knowledge of claims having been settled for excessively high amounts in order to save the companies trouble, and also to enable them to arrive as quickly as possible at the extent of their liability, whereas if they had been more thoroughly and judiciously dealt with they could, without doubt, have been contested and settled for a comparatively small sum. Such treatment of claims have a prejudicial effect on a Contractor's rate later on.

When fixing up a policy for workmen's compensation an insurer should see that under it he is indemnified from liability on account of all workmen, including casual and regular hands, under all Acts of Parliament to date, including the War Addition Act.

Employees in the building and contracting trade are usually classified as follows :—

Clerical staff.

Wood-working and other machinists.

Apprentices.

Quarrymen.

All other workmen.

Subcontractor's workmen.

The policy should be quite clear in respect to any restriction imposed as to nature and heights of buildings, depth of excavations, or use of machinery on contract. In some policies such as Lloyds', friction hoists, portable engines, electric motors, concrete mixers, mortar mills, and brick-crushers are not considered as mechanically driven machinery. If necessary cover should be had for quarrying and erection of special work, such as chimney-stacks, steeples, demolition of buildings, etc. Some contractors are under the impression that an ordinary workmen's compensation policy covers all these risks.

In order to be fully indemnified against all possible contingencies many contractors have the following clause inserted in their policies :—

Memo.—Workmen engaged on special risk, not included in the above schedule are held covered at rates to be arranged.

Another point should be quite clear, viz. that the Contractor is indemnified under his policy against any cost or charges that may be incurred in connection with any legal action that may be taken by the company in respect of any claims made upon them. If the company take action the company pays.

Claims.—In order to avoid unnecessary trouble and loss of time there are several small matters that should receive a Contractor's attention when an accident occurs, and there is any likelihood of a claim being made.

The following are typical :—

1. Formally advise the insurance company of the accident, and if possible give full details of the accident, injuries, claimant, witnesses, etc.
2. Enter the accident into Government factory book.
3. If accident is severe advise factory inspector immediately, but if otherwise do so after a week has elapsed.
4. Retain claimant's health and unemployment books.
5. When obtaining particulars of an accident endeavour to ascertain the name of claimant's previous employers. In the case of lead poisoning and other industrial diseases this is especially important. This information may be useful in placing his previous record should there appear a suspicion of malingering, and should it transpire that the injury or condition is due to or influenced by previous employment.
6. If claimant failed to report the accident immediately it occurred an explanation should be given for same.
7. If the accident was due to wilful negligence, keep a record of the names and addresses of any witnesses of the accident and also obtain from them signed and witnessed statements. Many a claim has been counteracted by such a procedure.
8. It may be necessary to deny liability of a claim. This should be done in a concise manner such as, "With

reference to yours of the 6th inst. we are satisfied that we are not liable and cannot entertain your claim." But no action of any kind that can be regarded as committal should be taken without instructions from the insurance office. This is a condition of insurance, and is very important.

Receipts on companies forms should always be taken from a claimant for all compensation paid them. Some companies do not provide official receipt forms, and in that case, when the final amount has been paid, a receipt on the following lines should be obtained.

RECEIVED this Sixth Day of February, 1926, of Messrs. Surrey & Kent the sum of Thirty-four Pounds in full discharge, satisfaction, and liquidation of all claims under the Workmen's Compensation Act of 1906 and 1917 and the Employer's Liability Act of 1880 at Common Law and otherwise howsoever in respect of an accident that occurred to me about the 19th of June, 1920.

£34 0 0.

*Witness to the
signature of*

STAMP

*Signature of
Claimant.*

This Receipt having been read over to him in my presence.

Mention subsequent Acts, if any.

It may, however, be pointed out that a registrar's powers are sufficient in Law to make such a receipt not binding on the party concerned. When a claimant sues for compensation at the Court and there is any suspicion as to the genuineness of the claim a certain amount of surveillance should be exercised over him. The writer was present during the hearing of a compensation claim when the claimant swore on oath that he had been unable to follow his usual employment since his accident. It was, however, subsequently proved by the defence that after the accident he had removed to another district and had followed his occupation without interruption. The evidence which led to this claimant's undoing was

gathered solely by the Contractor. The moral we must draw from the case is that it is not to the Contractor's interests to leave the management of his claims entirely to his insurance company. If there is any suggestion that he can make or anything which he can do to legitimately reduce the liability of a claim his services and knowledge should be at the company's disposal. A Contractor is often more favourably placed for the obtaining of information, and he should not hesitate to give his company the benefit of the advantage he possesses. His policy conditions demand this.

Third Party in Public Liability.—All owners of vehicles, carts, motors, plant, or employers of labour should cover themselves against loss arising through having to pay or defend claims for compensation made by members of the public for personal injury or damage to property caused by any defects in or about their premises or contracts by taking out one of these policies.

Driving Accidents.—All owners of horses and vehicles should take out one of these policies and indemnify himself against loss due to accidents or claims made by the public for personal injury or damage to property.

Boiler, Gas-engine, Electrical, and other Plant Explosions.—When boilers, etc., are in use contractors should not omit to take out one of these policies and thus cover themselves against (1) loss or damage to the boiler, engine, plant, etc., and (2) claims for damage to property or personal injury resulting from explosions or failure of such boilers. The cover also secures regular inspection by experts, and the benefit of their advice as to maintenance.

Plate-glass.—As soon as any plate-glass is fixed in any work a short period policy should be taken out against loss through breakage or from any other cause, except fire and war risks.

Contract Guarantee Bonds.—Where bonds are insisted upon for the fulfilment of a contract and it is inconvenient to obtain private or business friends to act as bondsmen, this class of policy serves a very useful purpose. Premiums are usually based on the amount of bond, nature of the contract, and experience and financial standing of the Contractor.

Fidelity Guarantee.—Cashiers, clerks, and others holding responsible positions and handling cash are usually called upon to provide a guarantee. This can be done for a small

charge without the trouble and inconvenience of calling upon friends or relatives to act as sureties.

Motor-cars and Vehicles.—It is hardly necessary to draw attention to this class of risk, cover should in nowise be neglected. There are many comprehensive policies on the market. This insurance should embrace the following :—

Claims by the public.

Damage to car.

Fire, explosion, or self-ignition.

Burglary or theft.

Injuries to paid drivers if not covered by W.C. Policy.

Lloyds issue a very useful policy covering “loss of use” for motor or steam vehicles.

Robbery or Burglary of Wages, Salaries, or Sundry Payments.—There is a very useful policy issued by Lloyds against loss of cash or notes in transit from “bank, counter, etc., until arrival at any of the assured’s premises or other places of disbursement, whilst there and until paid to the employees or otherwise disbursed.” The rate, viz. 2s. per £1000 per annum, is so very reasonable that a Contractor should not be without cover in that respect, e.g. if the annual drawings for wages amount to £10,000 the premium will only amount to £1. The anxiety saved for such a trifling amount must be apparent to anyone with practical experience in the handling of wages, etc.

Burglary.—Contents of the office, stores, etc., should be insured against burglars.

“Loss of Profits” Insurance.—The material loss caused by fire is universally recognised, but the loss of profits which invariably follows the dislocation and interruption of business by fire is only too frequently overlooked. This danger is, however, now being increasingly appreciated, and protection is not considered complete without a “loss of profits” policy. In the case of a Contractor this is, of course, more applicable to his sawmill and shops.

In conclusion it is well to give a note of warning in regard to the renewal of insurances.

For security the policy should always be examined, and one should be perfectly satisfied that it agrees with the description of the risk originally covered. Any alteration should be intimated to the society and the policy altered accordingly.

CHAPTER XLI

WATER FOR CONTRACTS

SEE our notes on this subject on pages 11 and 38.

In considering the possible cost of water for a contract the main factors to be taken into account are :—

- (1) The local water company's charges.
- (2) Cost of bringing water to site if no local waterworks supply.
- (3) The class or kind of work to be executed.

It is only from properly tabulated records of water consumed on work previously executed that a fairly accurate estimate can be formed. On an ordinary contract the concreting, cementing, and plastering usually make the greatest demand for water, so that if there is little or none of that class of work required the cost of water should be moderately low.

CHAPTER XLII

RATES AND TAXES

INCOME-TAX, like many other imposts, was a war measure introduced in 1799 to meet the expenses incurred by a war with France. Income-tax we still have and are likely to have with us for some considerable time. The tendency of rates and taxes is ever upwards, and is therefore of much concern to business people.

The various regulations governing taxes and the different rating methods adopted by local authorities also go a long way to perplex those who are not expert in such matters. They are often left in doubt as to what attitude they should adopt in making their returns or ventilating any grievance with reference to them.

It is always advisable where the sums involved are heavy to seek expert advice and guidance from an experienced and reliable accountant. In the following pages, however, we will endeavour to make clear one or two aspects of the subject which directly concern a Contractor.

Local Rates (Poor Rates, etc.).—Each local authority has its own particular method of valuation. There is much injustice done in many localities by glaring inequalities in assessments. It therefore behoves every ratepayer to satisfy himself that his property is rated in a fair ratio to the assessments of other property in the neighbourhood of a similar type. It is not generally known that a ratepayer can obtain access to the valuation register of his authority, and for his peace of mind and protection an occasional inspection will be found most beneficial. Some authorities make a small charge (about a shilling) for such inspection, and the privilege is often of considerable value to a discerning ratepayer.

In case of an appeal against any particular assessments it is obvious that if the attention of the Assessment Committee is drawn to some abnormally low-rated properties of a similar type in the district it may have the effect of obtaining from them the relief claimed. The assessment of properties owned

by members of such authorities can often with advantage be taken as a guide.

In order to arrive at the rateable value of property where the landlord pays the rates, a graduated scale of allowances is usually adopted, which is based on the "gross estimated annual rental." Thus :—

20% for houses not exceeding £18 annual gross rental.
 16 $\frac{2}{3}$ % " " from £18 to £25 gross rental.
 12 $\frac{1}{2}$ % " exceeding £25.

Example : Annual rental	.	.	.	£32	0	0
Less 12 $\frac{1}{2}$ % for repairs, etc.	.	.	.	4	0	0
				<hr/>		
Net assessment	.	.	.	£28	0	0

Where the tenants pay the rates the following mode is adopted for arriving at the assessment :—

Gross annual rental	.	.	.	£28	12	0
Less $\frac{1}{8}$ th for repairs (say)	.	.	.	3	12	0
				<hr/>		
Net assessment	.	.	.	£25	0	0

When a landlord occupies his property the assessment valuation is usually arrived at in the same manner as income-tax assessments under Schedule A (now about to be dealt with).

Income-tax.—*Schedule A (or Landlord's Property Tax).*—Relates to income derived from buildings, land, etc.

When the owner bears both rates and repairs the assessment of buildings is based on the gross or full rent, less a deduction for such rates and one-sixth for repairs. Thus :—

Yearly rent @ 10/- per week	.	.	.	£26	0	0
Less rates	.	.	.	5	18	0
				<hr/>		
				20	2	0
Less allowance for repairs $\frac{1}{6}$ th	.	.	.	3	7	0
				<hr/>		
Net assessment	.	.	.	£16	15	0

A further amount for repairs is allowable up to the amount of the average actual expense of upkeep on very small property.

The poor-rate assessment is usually a reliable guide. Should it be thought that the income-tax assessment is too high, a call upon the local inspector of taxes with the last poor-rate receipts will probably put the matter in order.

When the landlord occupies the property a guide to the assessment is 5 per cent on the value of the property plus the ground rent. Thus :—

Value of property, say, £400 @ 5% =	£20	0	0
Add ground rent, say	5	0	0
	<hr/>		
Net assessment	£25	0	0

Latterly assessments have been divided into two amounts on the income-tax demand notes :—

The ground rent and any mortgage interest paid on property being kept apart from the rest of the assessment ; e.g. we will presume that mortgage interest to the amount of £10 has been paid on the above property, in such circumstances the demand note will be rendered as follows :—

Ground rent (£5) and mortgage interest (£10)			
=£15 @ 6/- in the £	£4	10	0
£10 balance of assessment @ 3/-	1	10	0
	<hr/>		
	£6	0	0

When the tenant bears the cost of repairs the statutory allowance of one-sixth will not be made. A reduction of the assessment can be claimed for any period the property has been unoccupied, and a reduction in the assessment may also be claimed should the value of the property decline.

To arrive at the assessment for house duty add one-fifth of the repairs on to Schedule A assessment amount thus :—

Schedule A assessment	£25	0	0
$\frac{1}{5}$ th for repairs	5	0	0
House duty } assessment	<hr/>		
or gross	£30	0	0

Schedule D.—The taxable amount under this schedule comprises income which is derived from manufacture and trade, professions, occupations, etc. In preparing accounts, etc., for Annual Returns it is well to note that they must be based on the actual ascertained “average” profit for the three years immediately preceding the year for which the return has to be made. For instance, a firm making £304 profit, say, in 1916, £380 in 1917, and £351 in 1918, would return £345 as the average profit for which they would be liable for assessment in the year 1919/1920. If a business has been commenced within three years, then return on an average from the time of commencement.

The profit and loss accounts from which returns are made are not usually submitted until specially asked for. If the reader has a knowledge of book-keeping he will have little difficulty in making up a profit and loss account which should clearly show the profits (or losses) on all finished contracts, etc., and estimated profits, etc., on unfinished contracts for the financial period in question. All trade expenses, repairs, wear and tear, bad debts, rent of business premises, depreciation of plant, etc., should be deducted, but nothing for interest on capital.

Should a dwelling-house be connected with the business premises a maximum of two-thirds of the rent, rates, etc., may be deducted. A profit and loss account should be as concise as possible. It is a wise course to have the books examined periodically by a professional, and one who would, of course, prepare returns for income-tax authorities. It is not necessary to furnish details of the various items included in the return, but should the inspector subsequently make a request for further information a detailed trading account should be submitted. An inspector cannot, however, insist upon the production of a balance-sheet, consequently there is no obligation on the part of a trader to disclose his business “capital.”

The following example will, we think, serve as a guide for a profit and loss account for production to income-tax inspectors.

The chief concern of the Contractor should be his ability to thoroughly substantiate all the figures in his return, if called upon to do so :—

PROFIT AND LOSS ACCOUNT FOR 1918

	£	s.	d.		£	s.	d.
To Loss on Star Inn contract .	30	6	0	By Profit on—			
„ Rent account .	52	0	0	Storage contract .	250	5	0
„ Salaries account .	256	5	0	Schools „ .	40	16	0
„ Trade expenses account .	50	5	0	Cinema „ .	60	2	0
„ Depreciation of plant and machinery .	15	0	0	Warehouse „ .	38	7	0
„ Bad debts .	5	2	6	Foundry „ .	95	6	0
„ Balance down (nett profit) .	351	0	9	By Estimated profit on York School	150	0	0
				„ Balance of profit on garage .	75	1	0
				„ Sundry work account .	35	2	3
				„ Interest and discounts account	15	0	0
	759	19	3		759	19	3
				„ Balance down .	351	0	9

Most of the above items are, we think, clear to the reader, but possibly the “ Estimated profit on York School ” and “ Balance of profit on garage ” may need a little explanation.

The “ York School ” contract was in course of construction at the end of the firm’s financial year, therefore the profit or loss can only be an “ estimated ” one.

The “ garage ” contract was in progress at the end of the previous financial year, but has since been completed. The amount now shown is the profit made on this work less an amount credited as estimated profit in the previous year’s return.

With regard to the depreciation of plant and machinery item in our statement, an allowance may be claimed by the trader for diminished value by reason of wear and tear, etc.

The subject is a very extensive one owing to the varying sizes and classes of machinery and the purposes for which they are used. Treating the subject in a general way, the allowance is calculated on the value of the plant and machinery at the commencement of the year ; but possibly the fairest method to compute depreciation is to divide the firm’s machinery and

plant into classes and year of purchase, estimating the probable life of each, thus :—

Class A, 10 years ; reckon $1/10$ th of cost each year.

„ B, 15 „ „ $1/15$ th „ „

„ C, 20 „ „ $1/20$ th „ „

and make an “ annual ” allowance for depreciation from the “ first or original ” cost in the proportion suggested until the whole amount has been absorbed and allowed for. Future additions to plant, etc., to be treated in a similar manner.

The income-tax authorities' annual instructions in regard to depreciation of plant should receive fullest consideration.

Plant and machinery may include the Contractor's own horses and carts, etc., as is pretty widely interpreted by the income-tax authorities.

CHAPTER XLIII

RAILWAY RATES AND CHARGES

THESE are of such importance to the community that the maximum charges for nearly all services rendered by railway companies were fixed by Parliament and laid down in the Thirty-five Railway Rates and Charges Order, Confirmation Acts, 1891-92. They relate to six distinct classes, viz. :—

1. Goods.
2. Animals.
3. Carriage.
4. Dangerous goods, etc.
5. Perishable merchandise by passenger train.
6. Small parcels by goods train.

The first of these is the one that chiefly concerns us and to which we will confine our remarks. It is graded or subdivided into eight classes, viz. :—

A, B, C, 1, 2, 3, 4, and 5,

each having its own particular rating, A being the cheapest class, and 5 the most valuable.

There are also reduced class rates for articles marked in the classification book with the letters X, Y, or Z. For example : Goods of Class 5Y rating are entitled to a reduction of a sum equivalent to 15 per cent off Class 5 rate, etc., one condition applicable to these modified rates being that the goods are carried at the owner's risk. There is also a special scale of charges for returned empties.

Powers were granted railway companies under the Ministry of Transport Act, 1919, to increase their tolls, rates, and charges as from September 1st, 1920. Broadly speaking, these increases were, amongst others :—

100 per cent on A, B, C, 1, 2, 3, 4, and 5 classes.

150 ,, ,, small parcels, 3 cwt. and under, Classes 1 to 5.

75 ,, ,, merchandise and parcels conveyed by passenger train or similar service.

Plus a flat rate in the case of Classes A and B of 6d. per ton.
 " " " " C of 9d. "
 " " " " 1 to 5 of 1/- "
 with a maximum increase in the case of Class A of 4/- per ton

When goods are carried by railway companies they are charged at the rate in force between the forwarding and receiving stations for that particular "class" of goods.

A complete list of goods so classified can be obtained in the General Railway Classification Book, an extract from which is given on page 187. The reader is recommended to purchase one for his own edification and protection, a copy of which can be secured at most goods stations. It is published annually at a shilling per copy.

Information respecting rates can usually be obtained from the local Goods Office.

It is not our intention to discuss the process by which rates are compiled, but rather to point out a few matters which are within the power of the trader to remedy. It would greatly surprise many a trader were he made aware of the number of overcharges he unwittingly submits to in his railway accounts.

It has been estimated that railway companies are practically overpaid (in the matter of charges) to the extent of nearly 2 per cent of their annual turnover, nevertheless it must be candidly admitted that the fault lies, to a very great extent, with the traders and not with the railway companies.

The chief causes which contribute to this unsatisfactory state of things are not very difficult to locate and are enumerated below:—

- (1) "Improper" description or classification of traffic on consignment notes.
- (2) Traders lack of knowledge in general railway matters and ignorance of the Railway Classification Book.
- (3) Levies by railway companies of higher rates than they are legally entitled to, when doubt exists as to the exact nature of the traffic consigned.
- (4) Ordinary rates charged when "special" (or lower) rates are in force.
- (5) Incorrect rates charged by railway companies.
- (6) "Company" Risk rates charged instead of "Owners" Risk rates, etc.

36 GENERAL RAILWAY CLASSIFICATION OF GOODS, 1921.

	Class.		Class.
Brooms and Brushes, packed . .	3	Builders' Implements— <i>cont.</i>	
" " <i>e.o.h.p.</i>	4	Mortar Mills	Travelling
Brunswick Black—(see Special Classification, p. 362).		Poling	Cradles,
Brush Backs, Xylonite	3	Boards	<i>collapsed</i>
Brushes, iron wire, for cleaning		Pulleys	Trestles
boilers and boiler tubes, in		Ropes	Wheeling
boxes or cases	3	Scaffold	Pieces
Bucket Ears	C	Boards	Wheeling
<i>In less lots than 2 tons . . .</i>	I	Steps	Planks
Bucket Handles, iron or steel,		Struts	Windlasses.
<i>packed</i>	2	Building Blocks, Concrete	
Buckets, Ash, wrought iron, for		(Cement) — (see Concrete	
carrying Ashes on board Ship	2	(Cement)).	
Buckets, Colliery (or Bowks),		Bullet Moulds	3¶
iron or steel (for sinking pur-		Bullets, Small Arm	I
poses)	I	Bullets, Tracer—(see Special	
Buckets, Dredger, and Bucket		Classification, p. 333).	
Backs, iron or steel	Ii	Bullion—(see General Regula-	
Buckets, iron or steel, for Grain		tion No. 4, p. 1).	
Elevators, nested or packed . .	2	Bump Yarn, cotton, unbleached	2
Buckets and Pails, iron, nested		Bungs, iron or steel, for steel	
or packed	2	barrels, packed	I
Buckets and Pails, <i>e.o.h.p.</i> . . .	3	Bungs (wood), or Shives	I
Buckles, brass, iron or steel . .	3¶	(When accompanying Ale	
Buckles, Harness, iron or steel .	2	for the same consignee, are	
(Exceptional rates for Hard-		charged at the rates for Ale.)	
ware or for Chains and		Bungs and Corks	4
Traces apply.)		(Bungs and Old Corks,	
Buckram	3hd	when accompanying Ale for	
Buckwheat or Brank	Cg†	the same consignee, are charged	
Buffers and Buffer Heads, Rods		at the rates for Ale.)	
and Sockets, Railway Car-		Bunks, for Emigrant or Cattle	
riage and Locomotive, iron or		Ships, galvanised iron—	
steel, except in the rough . . .	Ii	<i>In cases</i>	2
<i>In the rough</i>	Ci	<i>In bundles</i>	3y
Buffers and Buffer Heads, Rods		Buoys Sinkers, iron or steel . .	Bi
and Sockets, Railway Wagon,		Buoys, <i>e.o.h.p.</i>	2*
iron or steel	Ci	Buoys, Life	3
Builders' Implements, not		Burnishers, Bit, packed	3¶
new, and consisting of mixed		Burrstones	C
consignments of the follow-		Busbies, Soldiers'	4
ing :—	I*	Busks, wooden or horn	3¶
Barrows		Busks or Bodice Steels	2
Centerings		(Exceptional rates for Hard-	
Crab		ware apply.)	
Winches		Butchers' Blocks, wooden . . .	3y
Hoists			
Ladders			
Mortar			
Boards			

* Subject to special arrangement when of unusual length, bulk, or weight, or of exceptional bulk in proportion to weight.

g Grain List.

y Reduced rate of Owner's risk.

† Grocery List No. 1.

hd Heavy Drapery List.

¶ Hardware List.

i Iron and Steel List.

When goods are carried under Classes 1 to 5, and the trader performs the "collection" or "delivery" or both these duties, he is entitled to claim from the railway company compensation for such services. It is the omission of the trading community to claim for such services that is responsible for a very appreciable amount of the enhanced profits of the railway companies mentioned above.

Classes A, B, and C refer to station traffic, and Classes 1 to 5 to collected and delivered traffic, with certain exceptions for heavy goods, as shown in Classification Book, e.g. see Corves (small wagons for use in collieries). Consignments not exceeding 3 cwt. are charged under a special "Small Parcels" scale, already mentioned.

Example A on page 189 is an extract of the scale before the increases or percentages granted under the Ministry of Transport Act, 1919, were levied. Example B gives the scale with all percentages to date added thereto.

Although the rates of Classes 1 to 5 include collection and delivery, yet there is no liability on a railway company to perform such services where it has no facilities for doing so or when the destination is not within the company's prescribed area. The railway company's responsibility ends when it has carried the goods from and to the stations mentioned on the consignment note, and in such circumstances the onus falls upon the trader.

The scale of rebates for such services varies a little in the different localities, but the following can be taken as being fairly general in regard to the provinces :—

1st class traffic, 4/2 ton each for collection or delivery.

2nd	"	"	4/10	"	"	"
3rd	"	"	5/6	"	"	"
4th	"	"	6/6	"	"	"
5th	"	"	8/2	"	"	"

For example, we will assume that a Contractor has a cask of art tiles consigned to him at a country address where there are no facilities at the local railway station for the delivery of same and that, as a consequence, the delivery has to be effected by the Contractor or his representative. Under such circumstance the Contractor is entitled to a rebate of 6/6 per ton for his services (art tiles being Class 4 traffic).

Another example may perhaps be helpful. We will assume

WEIGHT NOT EXCEEDING c. a. lbs.		RATE PER TON									
		191/9 TO 193/4	193/5 TO 195/-	195/1 TO 196/8	196/9 TO 198/4	198/5 TO 200/-	191/9 TO 193/4	193/5 TO 195/-	195/1 TO 196/8	196/9 TO 198/4	198/5 TO 200/-
0 1 0	0 1 0	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
0 1 14	0 1 14	3 11	4 0	4 0	4 0	4 0	9 10	10 0	10 0	10 0	10 0
0 2 0	0 2 0	5 2	5 2	5 2	5 3	5 3	12 11	12 11	12 11	13 2	13 2
		6 4	6 5	6 5	6 6	6 6	15 10	16 1	16 1	16 3	16 3
0 2 14	0 2 14	7 3	7 4	7 5	7 5	7 6	18 2	18 4	18 7	18 7	18 9
0 3 0	0 3 0	8 6	8 7	8 7	8 8	8 9	21 3	21 6	21 6	21 8	21 11
0 3 14	0 3 14	9 8	9 9	9 10	9 11	9 10	24 2	24 5	24 7	24 10	25 0
1 0 0	1 0 0	10 11	11 0	11 1	11 2	11 3	27 4	27 6	27 9	27 11	28 2
		12 1	12 2	12 3	12 4	12 5	30 3	30 5	30 8	30 10	31 1
1 1 0	1 1 0	13 3	13 5	13 6	13 7	13 8	33 2	33 7	33 9	34 0	34 2
1 1 14	1 1 14	14 6	14 7	14 8	14 10	14 11	36 3	36 6	36 8	37 1	37 4
1 2 0	1 2 0	15 8	15 10	15 11	16 1	16 2	39 2	39 7	39 10	40 3	40 5
		16 10	17 0	17 2	17 3	17 5	42 1	42 6	42 11	43 2	43 7
1 2 14	1 2 14	18 1	18 3	18 4	18 6	18 8	45 3	45 8	45 10	46 3	46 8
1 3 0	1 3 0	19 3	19 5	19 7	19 9	19 11	48 2	48 7	49 0	49 5	49 10
1 3 14	1 3 14	20 6	20 8	20 10	21 0	21 2	51 3	51 8	52 1	52 6	52 11
2 0 0	2 0 0	21 8	21 10	22 0	22 2	22 4	54 2	54 7	55 0	55 5	55 10
2 0 14	2 0 14	22 10	23 1	23 3	23 5	23 7	57 1	57 9	58 2	58 7	59 0
2 1 0	2 1 0	24 1	24 3	24 5	24 8	24 10	60 3	60 8	61 1	61 8	62 1
2 2 0	2 2 0	25 3	25 6	25 8	25 11	26 1	63 2	63 9	64 2	64 10	65 3
		26 6	26 8	26 11	27 1	27 4	66 3	66 8	67 4	67 9	68 4
2 2 14	2 2 14	27 8	27 11	28 1	28 4	28 7	69 2	69 10	70 3	70 10	71 6
2 3 0	2 3 0	28 10	29 1	29 4	29 7	29 10	72 1	72 9	73 4	74 0	74 7
2 3 14	2 3 14	30 1	30 4	30 7	30 10	31 1	75 3	75 10	76 6	77 1	77 9
3 0 0	3 0 0	30 30	31 31	32 32	33 33	34 34	78 4	78 11	79 7	80 4	81 1

a parcel of joinery was consigned from Blackheath to Whiteheath and that the railway company was unable to collect or deliver same, their charge for carriage being as follows :—

1½ tons joinery @ 25/- per ton (Owner's Risk rate) £1 17 6

On this transaction the trader is entitled to the following rebate under Class 3Y :—

1½ tons joinery, collection and delivery @ 5/6 per ton *each end* 0 16 6
 £1 1 0

Now, if the trader handling the above traffic is not acquainted with the privilege of claiming "rebates," the railway company stand to gain 16s. 6d. on the transaction. Railway companies do not permit deduction of rebates from their accounts. The trader has to submit his claim quite independently.

We give below an abridged classification list of goods usually handled by contractors :—

Traders are sometimes overcharged on small parcels traffic. The reader will note at the end of the Classification Book that railway companies have a "scale of charges for small parcels" (i.e. 3-cwt. parcels and under). Frequently goods of the same class are despatched together, but often charged separately instead of being lumped together, thus :—

		C. Q.				s. d.	
<i>Correct charge.</i>	1 range .	2	2				
	1 package	}	0				
	range						
	fittings						
				3	0	@ 85/-	<u>34 2</u>
<i>Incorrect charge.</i>	1 range .	2	2	@ 85/-	29	0	
	1 package	0	2	@ 85/-	7	9	
					3	0	<u>36 9</u>

These rates are worked out on the 1920 classification scale.

Articles can only be lumped together in the above manner when conveyed on the same day from the same sender and to the same consignee and by the same vehicle.

Class.	Class.	Class.	Class.		
Ashes or cinders	A	Cisterns and Tanks	2	Portable engine	Special
Bricks	B	Hardware and Iron- mongery	3	Paints and colours	2
Baths	2	Horse provender	1	R.W. pipes, range	2
Builders' implements and plant not new, consist- ing of mixed consign- ment of barrows, mor- tar boards, ropes, lad- ders, trestles, etc.	I	Joinery (ordinary)	3Y	Sand	A
Cement and plaster	C	Iron gates and railings " joists and girders Lead (sheet)	2	Screen	I
Castings (unpacked) Deals, battens, and boards	3	" (pipe)	I	Sawdust	I
Floor and wall tiles	C	Lime (in bulk)	2	Scaffold poles and planks Sash-weights	I
Drain-pipes (glazed) Glass	3	" (in bags)	B	Slates	I
		Laths	C	Stone (rough)	B
		Machinery (unpacked) " packed in parts Mortar mill	2	" (roughly wrought) " (dressed)	A B C
		Nails (small lots)	3	Tarpaulins	3

For example, Class C rate from one of our timber ports may be, say, 15s. per ton to a certain town, whereas the "special" rate for deals, battens, etc., may be only 12s. 6d. per ton.

A clear signature should be taken from Railway Companies' men for all goods handed to them for transit under Classes 1 to 5. This greatly assists the trader should any question arise in regard to breakages or missing goods.

Care should also be taken that all goods be properly and clearly described, otherwise high rates may be levied if there is any doubt as to the class to which they belong. Besides this, difficulties may arise should any claims result over the transaction.

The reader may find the following short list of weights useful for reference when dealing with the consignment of plant:—

7 to 8 h.p. portable engine	about 5 tons.
6 to 7 ft. mortar mill pan and frame	2½ "
6 to 7 ft. mortar mill rollers	2 "
Stone crusher (size about 12' × 6')	2 "
Cart horse	18 cwt.
Contractor's trolley (light)	14 "
" " " (heavy)	18 "
" " " cart	12 "
Scaffold poles, $\frac{3}{4}$ to 1 cwt. each.	
" " planks, $\frac{2}{3}$ to 1 cwt. each.	
Putlogs $\frac{1}{3}$ cwt. each.	

When Railway Companies provide wagons (where not included in the Conveyance Rate), they were permitted to charge, pre-war, 4½d. per ton when the distance did not exceed twenty miles; 6d. per ton when the distance exceeded twenty miles, but not greater than fifty miles, and so forth. Under the Ministry of Transport Act, 1919, these charges are subject to an increase of 100 per cent.

All firms who have extensive railway carriage accounts would be well advised to procure that very useful publication, *Railway Rates*, published by the Railway & Shipping Journal Publishing Co., 12, Cherry Street, Birmingham, in which rates are given for all classes of traffic from all parts of the kingdom to each of our large towns, a separate book being published for each town.

CHAPTER XLIV

"EMPTIES" AND SACKS

By "empties," we mean crates, casks, boxes, packages, wrappers, etc., used for the protection and packing of goods sent in transport. Empties are a necessary evil, whether charged for or included in the price of goods. They are always a source of worry to both merchant and Contractor, and unless systematically dealt with will inevitably prove a loss to both. This is especially so in respect of paint and putty kegs, where each maker's kegs are so much alike. In order to overcome this difficulty the Contractor should put a distinguishing mark on all empties of this description as they come to hand. When no separate charge is made for empties and they are of no value or service to the Contractor, the merchant from whom they are received is often glad to make an allowance for them if returned carriage paid and in good order. Sometimes it is not convenient to return empties for which a charge has been made. If approached in such circumstances, merchants or factors will usually allow half the invoiced price of them. Foremen at the various contracts want constant reminding in regard to the return of empties on their job.

To deal smartly and easily with empties it is necessary, as in all other business transactions, to have an easy and efficient record kept of them so that all debits and credits are clearly shown, and that the position of each firm's "empties record" can easily be traced. On page 273 will be found a suggestion for an "Empties Record Book." With regard to the return of empties, should no credit or acknowledgment come from consignees within a reasonable time after their despatch, a claim should be sent to the forwarding Railway Company for their value.

When a Contractor pays carriage for the return of empties (which the Railway Company as a rule insist upon) he must not look to the consignee to make a claim for anything that may be missing, as they have no *locus standi*.

Any claims made should embody the following particulars :—

- (a) Date of despatch.
- (b) Name and address of consignee.
- (c) Name of railway carman who collected and signed for the empties.
- (d) Railway Company's carriage charge, together with any references on same.

After the Railway Company has had ample time for consideration of any claim made before them, payment should be pressed.

Referring again to the question of carriage on empties, it may be of service to the reader to know that Railway Companies have an arrangement by which the empties of certain manufacturers, etc., are accepted “carriage forward.” There are some firms connected with the building trade who are at present included in the Railway Companies list (e.g. Pilkington Bros., Ltd., St. Helen's, Lancashire), etc. The list is published periodically for the guidance of railway officials and carmen.

CHAPTER XLV

RETURN OF GOODS AND MATERIAL

IT is not an uncommon thing to see in contractors' yards a large assortment of articles that have accumulated from various contracts from time to time. It is almost impossible to carry a contract to its completion without having goods of one kind or another left over, but if they are carefully and sparingly ordered in the first place there should be very little surplus. Surplus goods or material usually depreciate in value the longer they are kept in stock, so that it is advisable, where it can be conveniently arranged, to return the same to the merchants from whom they were obtained even if a concession on the original invoice price has to be made. It must be borne in mind that patterns and designs of various articles go quickly out of date, and that although the surplus goods may not be required by the Contractor the merchant on the other hand may have a ready sale for them.

The above remarks have special significance with regard to slates, tiles, ridges, sanitary ware, special ironmongery, wall-paper, etc. Sometimes surplus goods are accounted for by Architect's alterations from original plans. This, of course, cannot be avoided. Broadly speaking, a Contractor should avoid stocking any article left over from a job that cannot be termed general stock.

A Contractor's yard should not represent a "museum" of building material.

A duplicate advice should be made out and sent with all returned goods. This will ensure a record being kept of the transaction. The chief point to observe is that a priced credit note is received for them in due course.

CHAPTER XLVI

BREAKAGES AND SHORTAGES

THIS is a very engrossing subject and one on which much could be written, but our purpose now is simply to point out the main obligations which it imposes on the foreman and office staff.

It is incumbent upon all public carriers to deliver the full quantity of goods entrusted to them, free from all damage. A foreman should acquaint himself fully in regard to any consignments which are expected at the job and be on the *qui vive* for any breakages or shortages that are likely to arise at time on arrival, and if possible before unloading.

For general purposes his motto should be: Refuse all damaged goods, and only sign for the actual quantity received in proper order.

Of course, there are modifications and exceptions to this rule, and it is only discretion and experience that can decide in the various circumstances. When a Contractor consigns goods he should note that under Railway Clearing House Regulations no claim will be entertained for goods or empty cases lost in transit if complaint of non-delivery be not made within fourteen days after date of handing to carriers by consignor.

When damaged goods are accepted, the carman's attention should be drawn to them, and his delivery sheets signed accordingly. Such goods should then be carefully put on one side in a safe place as evidence pending enquiries that may be instituted in regard to any claim made in respect thereof.

Railway Companies are under an obligation to return to senders "carriage free" certain classes of goods damaged in transit. Therefore, in order to avoid carriage on such goods when returned for repairs or replacement, care should be taken that they are consigned by the same carriers or route, and specially noted "Carriage free. Broken in transit."

If a claim is made in respect of goods lost or broken in transit, and which have been improperly classified on consign-

ment note, the Railway Company is within its rights in refusing payment of such claim.

The custom of signing for goods when delivered as "Not examined" is now treated by carriers as a clear signature, and no claim for shortages or damage will be entertained by them unless such shortage or damage be clearly stated on carrier's sheet or immediately notified.

Packed goods must be opened and examined, and if damaged carrier and sender advised within three days of delivery.

To obtain every protection the above instructions should be complied with. The proper persons to claim for loss and breakage of goods during transit are the owners of such goods, whether they be consignors or consignees, e.g. claims should be made by senders when goods are consigned carriage paid, and by consignees or receivers when consigned carriage forward. Immediately there is a case for a claim an invoice should be rendered to Railway Company or Carriers stating :—

- (1) The amount of damage suffered (which should include actual cost of replacement).
- (2) Time and date goods were received.
- (3) Carman's name and any marks of reference that may appear on carrier's sheet.
- (4) Sender's full address.

It is practically useless sending in a formal notice of damage to carriers without backing it up with a monied invoice, as it is seldom taken any serious notice of. If the claim is not given attention within a reasonable time the matter should be pressed. It is often only by constant pressure that matters can be brought to a satisfactory head. Traders too often make abnormal or fictitious claims on carriers for damaged or lost goods and this partly accounts for a good percentage of the delay experienced in settling claims with Railway Companies. When traders are open and above-board, and able to produce documentary evidence, claims do not suffer unusual delay, i.e. if well followed up, as suggested.

CHAPTER XLVII

PAYMENT OF WAGES

As previously suggested, the particulars of each man's wages should be shown in detail on his wages bag. The wages bags of all workmen in the Contractor's employ should be made out at the head office and the money put into them, all ready checked for payment. The custom of sending cash on to a job in a haphazard fashion is often the cause of misunderstanding and errors, and apart from that the principle of the policy, or want of policy, is bad.

When the bags are all properly made up and checked beforehand, the only question that can possibly arise is the foreman's account of the hours worked, or subs. given out. The practice of allowing the foreman to pay his own workmen is also questionable. One of the office staff should always be in evidence at the jobs on pay-day. Before payment is made, every workman should be instructed to call out the total hours he has worked, and if his account does not agree with his wages bag the matter should be investigated. Again, foremen should not be allowed too much licence in the matter of paying off workmen. When workmen are being constantly taken on and paid off between one pay-day and another for no definite reason, or without consultation with the Contractor or his representative, there is room for suspicion that all is not well.

Whenever possible, workmen about to be discharged should be paid off from or at the head office of the Contractor.

The principal thing to guard against is collusion between foremen and workmen.

CHAPTER XLVIII

STOCKTAKING

IN order to discover his true financial position at stated periods, it is necessary for a Contractor to take a record of the general stock and plant (including tools, machines, etc.) he possesses at his various yards, contracts, etc.

On the correctness of stocktaking largely depends the accuracy of the Profit and Loss Account and balance-sheet. Stocktaking usually means a certain amount of dislocation of business and for that reason is usually taken about Christmas-time, when general building operations are slack. Often at this period the yard mill is closed down for repairs to machinery, etc., and stock-taking can, as a consequence, be done under more favourable conditions. It should be taken in a systematic manner. Each department at headquarters and also each contract should be taken separately.

The following gives a general idea of the various departments at a Contractor's headquarters. The general stock should be kept apart from plant :—

Cement stores.	Stables and motor garage.
Drain-pipe and brick stores.	Nail stores.
Engine-room.	Office furniture & stationery.
Glass and paint stores.	Plumbers' shop.
Ironmongery stores.	Rain-water goods stores.
Joiners' shop.	Smiths' shop.
Mess-room and stores.	Slate stores.
Timber in yard and racks.	General goods in yard, etc.

A small notebook should be provided for each section, into which the stock should be entered. These should afterwards be copied into the general stock book ready for pricing up. Stock should only be taken by persons who understand the value and purpose of the various goods and plant.

Unless a person has a practical knowledge it is difficult to perceive how he can avoid entering up many articles which are of little or no practical value, or overlooking or under-

rating others which are of considerable commercial value, thus placing a fictitious value on the whole.

Before actual stock-taking commences a general process of tidying up should be arranged. Labourers should be deputed to clear up the yard and put timber, bricks, drain-pipes, R.W. goods, etc., in such order that stock can be taken with a minimum of inconvenience. Apprentices and others should be requisitioned to tidy up the ironmongery stores, parcel up any loose stuff that may be left about, and generally sort out and arrange the goods. Labels should be attached to all parcels stating the quantity and nature of the contents. In properly kept stores the names of the makers or factors from whom the goods were purchased as well as the cost prices are given in private code on the parcels, which considerably lessens the labour in pricing up the stock book. Painters' stores should also receive attention, any empty kegs, drums, etc., that can be conveniently returned to manufacturers should be disposed of before actual stock-taking day.

With regard to the pricing of stock, if a "Record" purchase price book as previously recommended is being kept it will not be a very burdensome duty. However, a safe rule is to value goods at about cost or current market prices, whichever is less.

With regard to the question of depreciation of plant the reader can do no better than to follow out the latest annual instructions issued by the income-tax authorities in their "Notes and Explanations" in regard to "exemption, abatements, allowances, and release."

CHAPTER XLIX

CATALOGUES

NOWHERE is it more necessary that proper care should be bestowed on catalogues than in a Contractor's office. It is essential to the true progress of a firm that it should possess a well-stocked, nicely arranged, and tabulated book-case of literature relating to the various kinds and classes of goods connected with their business, the contents of which should be in an "alphabetical" as well as a "numerical" index attached to same.

It is, of course, necessary with the constant influx of new catalogues and ever-changing nature and values of building specialities that only the latest lists should be retained in the cabinet. Out-of-date literature should be discarded.

Business has been very truly described as "applied knowledge," and knowledge that counts is very often drawn from catalogues. Notwithstanding the fact that catalogues and building literature generally is of such importance to the ordinary Contractor it is very surprising to note how very few firms take an intelligent interest in them, and this to a great extent is one of the contributory causes of the abnormal increase, of late years, in the number of "Builders' Merchant" businesses. The flourishing condition of many of these merchants cannot be accounted for by the size and variety of their stocks, but by the fact that they have carefully studied (through the medium of trade catalogues, etc.) the science of purchasing and learned to meet the deficiency caused by Contractor's neglect and laxity in these matters.

There is no apparent reason why the Contractor should not emulate the merchant in that respect. It will certainly be to his advantage to do so. With this in view we will proceed to indicate the general lines on which he should arrange his books in order to attain the desired end. Many merchants naturally purchase more extensively than contractors, but the fact must not be lost sight of that many manufacturers are willing to concede equal terms to contractors and merchants, in fact, many prefer to deal direct with contractors.

If a Contractor has not a good collection of catalogues he should take immediate steps to get one. A post card to manufacturers, etc., is usually sufficient to obtain any desired list.

To obtain the best results a proper classification of lists and catalogues should be adopted.

Opinions may differ as to the most serviceable system to adopt, but as long as a system has no complications and it can be perfectly understood by those it is intended to serve, it answers its purpose. We would suggest a cabinet be provided that has nine sections. Each section having, say, fifty (more or less) catalogues allotted to it.

For example :—

A section may contain Nos. 1 to 50 catalogues.

B " " " 51 to 100 "

C " " " 101 to 150 " etc.

Then again each section should contain catalogues referring to some specific class of goods, on the lines suggested in the Building Materials list on page 204.

To obtain the quickest mode of reference to the various lists two distinct indexes should be kept.

(1) An *alphabetical* index of the firms whose lists, etc., are included in the book-case, e.g. :—

	Catalogue No.		Catalogue No.
Abel & Co.	62	Arnold & Ross.	8
Aldridge & Son	49	Arthur & Co.	3
Alexander & Bridge	1	Aubrey & Davies	29
Allen, Ltd.	53	etc.	
Anderson, Ltd.	10		

(2) A "*sectional*" index, i.e. a list of the various firms whose catalogues are in each section thus :—

Section A—

Catalogue No.		Catalogue No.	
1	Aubrey & Davies.	6	Wright & Son.
2	Stephens, Ltd.	7	Martin, Ltd.
3	Arthur & Co.	8	Arnold & Ross,
4	Watts & Davies.		etc.
5	Morgan & Co.		

If from shortage of staff or any other reason it is found inconvenient to number each catalogue, the placing of them in distinctive sections as suggested can still be adhered to.

A warning in conclusion. Insist on having all books put back after use.

BUILDING MATERIALS

Section A—

Artificial stone.	Granite and stone.
Asphalte, asbestos sheets, and tiles.	Felts and sound-proofing.
Bricks.	Paving, composition floors.
Cements, limes, and plaster.	Slates and roofing tiles.
Chimney-pots, etc.	Roofing materials.
Damp courses.	Terra-cotta and faience.

DECORATIVE MATERIALS

Section B—

Art metalwork.	Marble substitutes.
Carving and sculpture.	Paints, enamels, distempers.
Decorative glazing.	Preservatives.
Decorative plaster.	Wall and floor tiles.
Decorators.	Wall-paper.
Marble Mosaics.	Varnishes and stains.

IRONMONGERY AND JOINERY

Section C—

Casements and sashes.	Panelling and linings.
Door furniture.	Revolving shutters and doors.
Door springs.	Sash-chains and pulleys.
Folding partitions.	Sundry fittings.
Gates and fencing.	Window fittings, gearing.
General joinery and turning.	Woodblocks, parquet.
Locks and latches.	
Metal furniture.	

IRON AND FIREPROOF CONSTRUCTION

Section D—

Ferro concrete.	Iron doors and safes.
Fireproof floors.	Iron fencing and gates.
Fireproof partitions, etc.	Lanterns and skylights.
Fire appliances.	Lift hoists, cranes, etc.
Fireproofing.	Stairs (fire-escape, etc.).
Girders and joists; castings.	Stair treads, strong rooms.
Steel construction.	Wrot ironwork.

SANITARY AND WATER SUPPLY

Section E—

Baths.	Sewage disposal.
Drainage and plumbing.	Sinks.
W.C.'s and earth closets.	Sundry fittings.
Lavatories and urinals.	Tanks and cisterns.
Pumps and water supply.	Water softening.
Rain-water goods.	

WARMING AND VENTILATION

Section F—

Anthracite stoves.	Hearth fires.
Boilers, radiators, and geysers.	Hob and dog grates.
Chimney-pieces.	Interiors and register grates.
Cooking apparatus.	Mantel registers.
Electric heaters.	Stoves (gas, hot air, etc.)
Heating and ventilating.	Ventilators.

LIGHTING AND FITTINGS

Section G—

Clocks, bells, telephones, etc.	Gas-lighting systems.
Daylight increasing devices.	Patent glazing.
Electric-light fittings.	Pavement lights, etc.
Electrical engineers.	Signs and blinds.
Gas-fittings.	Wiring systems and lamps.

WORK AND FITTINGS FOR SPECIAL BUILDINGS, ETC.

Section H—

Baths and laundries.	Schools, laboratories.
Churches, lightning conductors.	Shops, workhouses.
Cold storage.	Stables, farm buildings, abattoirs.
Garden furniture.	Temporary and composite buildings.
Horticultural buildings.	Theatres and halls.
Hospitals and asylums.	
Libraries.	

PLANT AND GENERAL MACHINERY

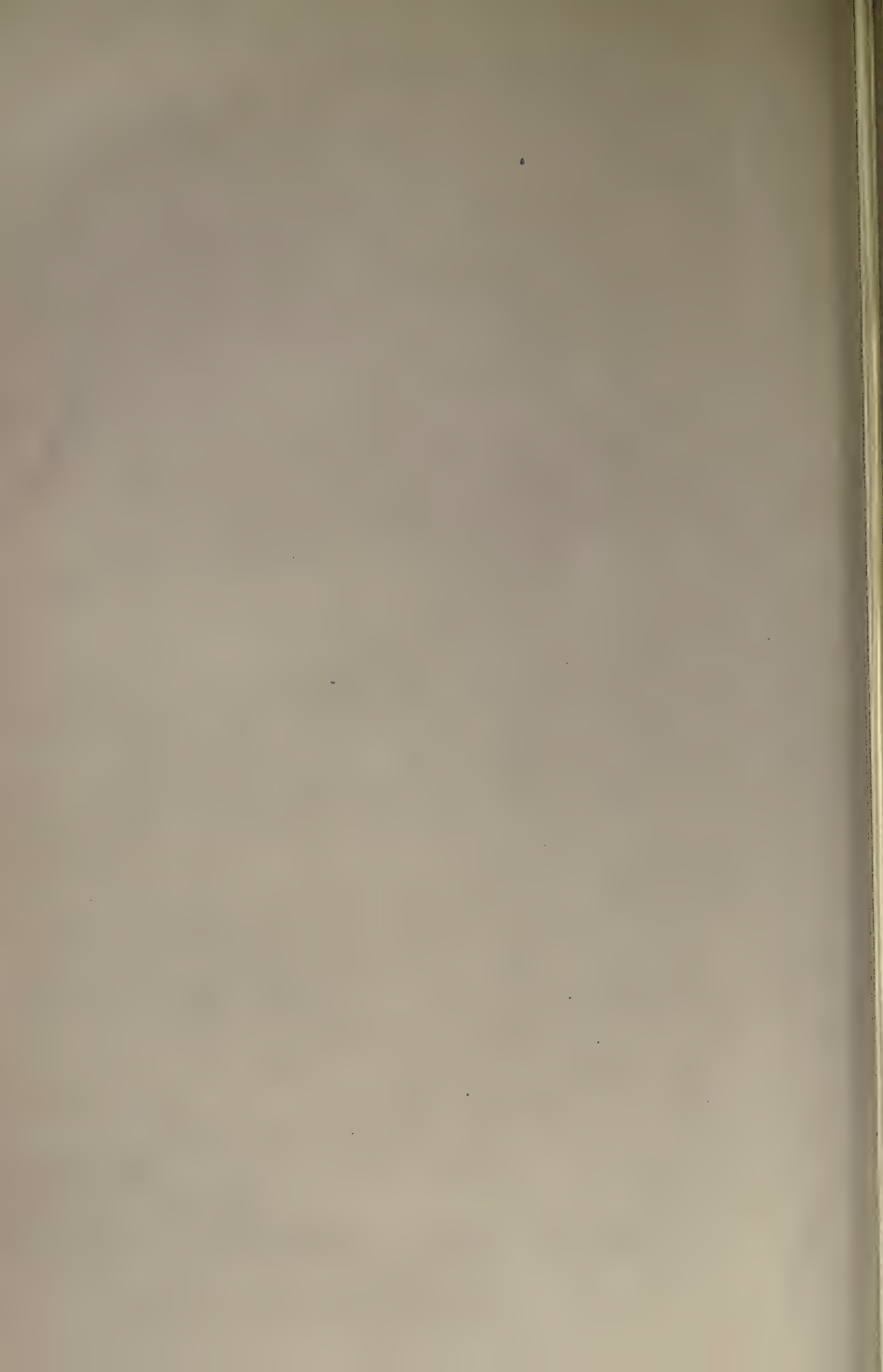
Section I—

Belting and shafting.	Lifting machinery and blocks.
Concrete mixers.	Portable rails and tip wagons.
Concrete block-making machines.	Pumping machinery.
Electrical plant.	Stonebreakers.
Elevators and travelling gantries.	Wood-working machinery.
Engines and mortar mills.	

We think the list here given covers, fairly well, the range of materials, etc., handled more or less by building contractors.

Every list drawn up and decided upon should be posted up in a prominent place near the cabinet, handy for general reference.

PART III
BOOK-KEEPING, ETC.



CHAPTER L

BOOK-KEEPING

WHETHER his business be large or small, or the times bad or good, it is imperative that a Contractor should watch the progress of the same very closely and be conversant with the true financial state of his affairs.

To do this it is essential that he should have a system of book-keeping which is simple yet absolutely reliable and trustworthy.

It is assumed that our reader has a rudimentary knowledge of book-keeping, and that it is unnecessary to touch upon very elementary points.

There are already many able books on the market dealing exclusively with the subject of book-keeping, and on that account we will not enter into the advanced stage of the subject, such as the preparation of Trading Accounts, Profit and Loss Account, and Balance-sheets, but solely concern ourselves with a Contractor's general set of account books, from which he may learn at any time his true progress in regard to individual contracts which he has in hand, and other necessary information regarding debtors' and creditors' accounts. Should the reader feel desirous of pursuing the subject further, he is recommended to study some book specially dealing with the subject, such as Carter's *Advanced Accounts* (Sir Isaac Pitman & Sons), etc.

The principal books required by a Contractor are the following, which should be based on double-entry system, as per our examples:—

- Invoice book.
- General Accounts book.
- Journal.
- Cash book.
- Petty cash book.
- General ledger.
- Prime cost book.
- Prime cost ledger.
- Private ledger.

In addition, the following are also needed :—

Wages and machinery book.
 General stores book.
 Timber book.
 Haulage or transport book.
 Transfers book.
 Joinery cost book.

Again, the following subsidiary books are more or less essential :—

Contracts account book.

Order book.

Delivery book.

Plant book.

Empties book.

Returns Advice book.

Letter copying book.

Accounts copying book.

Specification copying book.

Statements copying book.

Estimates copying book.

Receipt book.

} Or Duplicate Files
 in each case, etc.

Various examples have, of necessity, to be furnished in order to demonstrate certain principles involved in our subject, but it must be noted that owing to the fluctuating nature of both prices of materials and rates of wages, all cost figures given therein are “illustrative only,” and should therefore not be taken as correct rates to be worked from.

For convenience we will take each book separately and in the order enumerated above :—

Invoice or Purchases Book.—This contains a record of invoices received for goods purchased or of any charges for which the business is liable. The problem of how to deal satisfactorily with invoices is fully dealt with in our Prime Cost article.

After invoices and credit notes have been duly checked, they should be numbered, filed, and the contents entered into the invoice book as shown on page 242.

There is a column for the date, name of creditor, ledger folio and cost analysis. At the end of the month a total should be struck and the amount of each invoice and credit note posted

to the ledger, and the several items in the cost analysis carried to the monthly prime cost book (see page 227).

General Accounts Book.—A duplicate should be kept of every invoice rendered by the Contractor, whether for work done or goods sold. The most reliable method is to set apart for the purpose a copying book (called the Bills Copying Book)

GENERAL ACCOUNTS BOOK

ACCOUNTS BOOK.

Date.	Reference in B. C. Bk.	Ledger a/c.	Cost Ledger a/c.	G. L.	P. C. L.	Amount.
Jan. 6	92	Marsh & Co.	John Street Warehouse	71	110	£ s. d. 950 5 5
Feb. 10	93	Williams, Ltd.	Gloucester Brewery	82	132	650 10 0
„ 17	94	Bishop & Co.	Oxford Garage	94	104	90 15 6
March 9	95	Roles & Co.	Park Street shop	68	89	73 9 0
„ 11	96	Allen & Jones	Ross School	52	106	150 10 0
April 2	97	Gaskell & Eyers	Globe Cinema	70	108	309 17 6
„ 4	98	Hollywood, Ltd.	Town Hall	33	115	720 2 9

and copy into same every account before it leaves the office. The total of each account should afterwards be entered into the Accounts Book.

It will be seen from our specimen accounts book that there are columns reserved for posting the items to the General Ledger and Prime Cost Ledger. The postings to the General Ledger being placed to the debit of the customers or Building Owners concerned, and the postings to the Prime

Cost Ledger to the credit of the various contracts and nominal accounts.

Journal.—The Journal does not come very much into evidence, it being used simply to deal with exceptional items, such as depreciation, interest charges, bad and doubtful debts, etc., which cannot conveniently be dealt with in any of the

JOURNAL

JOURNAL									
		Ledger.	Dr.			Cr.			
			£	s.	d.	£	s.	d.	
June 30	Mr. John Mainwaring .	49	20	5	0	—	—	—	
	Interest $\frac{a}{c}$	600	—	—	—	20	5	0	
	$\frac{1}{2}$ year's interest on £810 @								
	5 %	—	—	—	—	—	—	—	
Dec. 31	John Tindall & Co. . .	74	—	—	—	29	5	0	
	Thomas Carter, Ltd. . .	92	—	—	—	33	6	0	
	Bad debts $\frac{a}{c}$	500	62	11	0	—	—	—	
	Bad debts written off.								

preceding books. The above example will, no doubt, sufficiently explain matters.

Cash Book.—This book is used for the purpose of recording all payments made and received by the Contractor, and which have passed through his Banking Account. The Cash Book should be ruled off at the end of each month and the posting to ledger always kept up to date. Discounts are entered into the first column, General Ledger items into the second, and Cost Ledger items into the third. See example on page 215.

Petty Cash.—Two separate books are usually kept for Petty Cash—one to record Sundry Cash Sales and the other Sundry Disbursements. These should be balanced off monthly and the amount received from sales paid into the bank (see item £6 8s. od. on page 216), and a cheque drawn for the month's disbursements in order to readjust the cash balance (see item £3 2s. 3d. on page 218).

It may be explained here that the Petty Cash Purchases Account is usually started with a working cash balance to meet current expenses. An amount of, say, £10 is drawn from the bank, and this is kept as a floating balance by drawing a cheque at the end of the month for the actual amount of the month's purchases, as mentioned above.

General Ledger.—Into this book are posted all accounts and payments from the previously mentioned books.

It contains all personal and nominal accounts. By personal accounts is meant *Debtors and Creditors*, and Nominal Accounts, Wages, Rates, Rents, Insurance, and such-like. Contract and real accounts (such as Machinery, Plant, etc.) are dealt with in Cost Ledger.

To obtain the best economical results from an ordinary ledger it should be systematically divided up and classified.

Assume, for instance, that a ledger contains a thousand folios. It could, perhaps, with advantage, be partitioned off in the following manner :—

Folios	1 to	200—	for Debtors' Accounts.
„	201 „	250—	for Sundry Debtors.
„	251 „	500—	reserved for further extension of debtors.
„	501 „	700—	Creditors' Accounts.
„	701 „	800—	Sundry Creditors.
„	801 „	900—	Reserved for further extension of Creditors.
„	901 „	1000—	Nominal Accounts.

A great saving of time can be effected and mistakes often prevented by keeping accounts in this manner, e.g. if it is desired to obtain at short notice a list of Debtors and Creditors, matters are greatly facilitated and simplified by this system, for although the balances of some accounts often change from that of a debit one to a credit one, or vice versa, yet in the main each class of account will be found in its particular section.

In an ordinary Contractor's business the number of creditors

76

CASH

		Discount.					
		£	s. d.	£	s. d.	£	s. d.
June 1	To Weekly rents .	—	—	6	9 0	—	6 9 0
2	„ Cinema contract	—	—	100	0 0	—	100 0 0
3	„ Albion Hotel .	—	—	250	0 0	—	250 0 0
5	„ Blackheath Hospital .	—	—	400	0 0	—	400 0 0
8	„ Weekly rents .	—	—	6	5 0	—	6 5 0
9	„ Technical School	—	—	150	0 0	—	150 0 0
10	„ Morgan & Co. .	2	0	4	10 0	—	4 10 0
13	„ Jeffreys & Son .	7	6	16	7 6	—	16 7 6
15	„ Weekly rents .	—	—	5	14 0	—	5 14 0
17	„ Watkins & Co.	10	6	20	8 0	—	20 8 0
19	„ Leward & Co. .	—	—	13	9 0	—	13 9 0
22	„ Weekly rents .	—	—	5	18 0	—	5 18 0
24	„ P.O. Hampstead	—	—	500	0 0	—	500 0 0
25	„ Lowther & Co.	—	—	7	5 0	—	7 5 0
27	„ St. Marks, Brixton .	—	—	250	0 0	—	250 0 0
29	„ Weekly rents .	—	—	6	2 0	—	6 2 0
30	„ Downing & Co.	—	—	7	9 0	—	7 9 0
	„ Petty cash sales	—	—	—	—	6 8 0	6 8 0
	„ Discount account	4	10 9	—	—	—	—
	„ Balance forward	—	—	2088	9 8	—	2088 9 8
		5	10 9	3838	6 2	6 8 0	3844 14 2

BOOK

CONTRA				76			
	No. of receipts.		Discount.				
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
June 1		By Balance forward	—	2577 2 8	—	2577 2 8	
2		„ Workmen's wages	—	160 8 0	} —	176 3 0	
4	79	„ Office wages	—	15 15 0			
9		„ Hospital subscription	—	—	2 2 0	2 2 0	
9		„ Workmen's wages	—	170 11 5	} —	186 6 5	
8	81	„ Office wages	—	15 15 0			
9	82	„ J. Dickson	—	12 6	—	12 6	
16		„ Ben Hopkins' account	—	15 0 0	—	15 0 0	
17	83	„ Workmen's wages	—	185 9 2	} —	201 4 2	
18		„ Office wages	—	15 15 0			
21		„ Mainwaring & Co.	3 19 6	49 1 0	—	49 1 0	
22	84	„ New cheque book	—	—	1 5 0	1 5 0	
25	85	„ Workmen's wages	—	236 9 4	} —	252 4 4	
30		„ Office wages	—	15 15 0			
86		„ Goldsworthy & Co.	1 11 3	29 13 11	—	29 13 11	
87		„ Motor Assn. annual sub.	—	—	2 2 0	2 2 0	
		„ Workmen's wages	—	307 8 3	} —	323 3 3	
		„ Office wages	—	15 15 0			
		„ Rates and taxes	—	11 0 8	—	11 0 8	
		„ Bank charges	—	—	5 6 0	5 6 0	
		„ Sebourne Estate	—	9 5 0	—	9 5 0	
		„ Petty cash purchase	—	—	3 2 3	3 2 3	
			5 10 9	3830 16 11	13 17 3	3844 14 2	

where a "Loose Leaf Ledger" is concerned, yet the general principle of classification still remains good.

It is often found more convenient for reference, etc., to open special accounts in the General Ledger for certain particular charges, such as

Ground rents,
Rents,
Lighting and Heating,
Quantity deposits,
Insurances, etc.,

in preference to posting them under the names of the individuals or firms concerned in the transactions. For instance, a Contractor may periodically be liable for ground rent to several persons or estates, the particulars of which could be posted, with advantage, into one account, thus :—

GROUND RENTS

		C. B.	£ s. d.				I. B.	£ s. d.	
June 30	To cash Seabourne	76	9	5 0	June 24	By rent Seabourne Estate Office	58	9	5 0
Oct. 2	„ Aston & Co	86	15	5 0	Sept. 29	„ Aston & Co.	72	15	5 0
„	„ Jackson	86	10	10 0	„	„ Jackson Syn- dicate	72	10	10 0
Dec. 31	„ Seabourne	90	9	5 0	Dec. 25	„ Seabourne Estate Office	91	9	5 0

Monthly Prime Cost Book.—Into this book (see example on page 224) are entered the monthly debit and credit totals of the following books :—

Wages and machinery,
Invoices,
General stores,
Timber,
Haulage or transport,
Petty cash (sales and purchases),
Transfers.

It will be noticed that if the various summaries are correctly entered the figures automatically balance.

The chief item to which we wish to draw the reader's attention

PURCHASES ACCOUNT

101

		Cost Account.	£	s.	d.
June 1	Stamps	Trade expenses .	0	10	0
" 2	Tram fares	Albion Hotel .	0	2	6
" 3	Telegram (Wharton) .	"	0	1	3
" 4	Advert., scaffolder .	Cinema	0	2	0
" 5	Carriage on empties (G.W.R.)	"	0	0	9
" 6	Carriage on sacks (G.W.R.)	Blackheath . .	0	2	6
" 8	Horse powders	Haulage account .	0	1	9
" 11	Matches and soap . .	Trade expenses .	0	1	6
" 12	Scrub brushes and floor- cloths	Albion Hotel . .	0	3	6
" 13	Flour and whitelime . .	Rent account . .	0	2	3
" 15	Carriage on felt	General stores .	0	0	11
" 17	Advert., plasterers . .	P.O., Hampstead	0	2	6
" 18	" labourers	St. Mark's, Brixton	0	1	6
" 20	Stamps	Trade expenses .	0	10	0
" 22	Gum and pencils	"	0	3	6
" 24	Tram fares	Technical School	0	4	6
" 25	Advert., bricklayers . .	Hospital, Black- heath	0	2	6
" 26	Toll-gate money and weighing	"	0	1	4
" 29	Telegram (Smith) . . .	P.P., Hampstead	0	1	0
" 30	Road money	"	0	1	0
" 30	Spirits of salts	"	0	5	6
			3	2	3
	Balance forward		10	0	0
			13	2	3

SUMMARY.

	£	s.	d.
Trade expenses	1	5	0
Albion Hotel	0	7	3
Cinema	0	2	9
Blackheath Hospital . .	0	6	4
Haulage	0	1	9
Rent	0	2	3
General Stores	0	0	11
Hampstead P.O. . . .	0	10	0
St. Mark's, Brixton . .	0	1	6
Technical Schools . . .	0	4	6
	3	2	3

Entered Cost Book, Folio 33.

is the "Trade Expenses," or "overhead charges," column. It will be noticed that Trade Expenses are charged on all contract accounts (nominal accounts, such as Wages, Timber, etc., being exempted).

If a Contractor wishes to ascertain the cost of any work in hand his books should, of course, be able to disclose the fact to him, but if no provision is made in them for Trade Expenses the figures do not present a true state of affairs, and are consequently misleading. To debit a certain sum for Trade Expenses at the completion of a contract does not sufficiently meet the case. Trade Expenses are current, and should be dealt with currently. This method is the safest and the fairest which can be applied in the circumstances.

An objection may be raised to the method suggested on one or two grounds. First, that the actual Trade Expenses are often heavier (in proportion to cost) on one job than on another. Secondly, that the percentage as a whole is in excess of, or inadequate to cover the total Trade Expenditure incurred. These objections are often more imaginary than real, and in each case can be satisfactorily dealt with, e.g. if after dealing with expenses in the manner suggested the Trade Expenses or Overhead Charges Account shows at the close of the financial year an excessive balance either way the matter can easily be adjusted by a transfer from the Trade Expenses Account to any one (or more) accounts which may be considered either over or under charged. It is only by actual experience in the keeping of a Trade Expenses Account that an approximate percentage can be fixed upon. It will be noted from our example that the folios of the books from which the various summaries have been taken are placed at the head of the respective columns. A space is allowed on the right hand of the Prime Cost Book for the posting folio of the Prime Cost Ledger.

Prime Cost Ledger.—The totals of the various accounts in the monthly Prime Cost Book are posted here.

The balances of all accounts in this book are eventually posted direct to the Profit and Loss Account in the Private Ledger, or into a Private Accounts Journal, in the following manner:—

- (a) Nominal Accounts, etc., at the close of each financial year, and
- (b) Contract Accounts at the close of each contract.

Private Ledger.—The Private Ledger is the Contractor's "Capital or Personal Account Book." The various totals of the

- (1) Proprietary (or Nominal)
- (2) Contract, and
- (3) Real Accounts

are posted into this book, and it is from here that balance-sheets are drawn up.

We will now enter more fully into the subject of Prime Costing.

CHAPTER LI

PRIME COST

WHEN visiting contracts or directing operations at his office or elsewhere the "Prime Cost Spectre" invariably shadows a Contractor. It scarcely matters what transactions occupy his activities, most are directed with the purpose of minimising cost. If, therefore, the subject is of such paramount importance from an administrative point of view, the system for recording it should certainly lay claim to our undivided attention. By an efficient system of prime cost, a Contractor should be able to ascertain at any time his true financial position in relation to any of his contracts as well as the drift of his business generally. Notwithstanding this fact, however, it can confidently be stated there are very few contractors (comparatively speaking) who understand how to systematically and effectively keep a proper Prime Cost Account. Many contractors are more or less ignorant as to the real cost of the work they execute, being perfectly satisfied so long as their annual balance-sheet shows a profit on the year's work. Of course, such a condition of affairs is not idealistic. The suggestions put forward in the following chapters are presented with the object of leading the reader towards the most efficient and trustworthy methods of keeping the various nominal (or departmental) and contract costs. The two chief essentials for Prime Costing are promptitude and accuracy. A Prime Cost Account is utterly useless for all practical purposes unless kept well up to date. This point cannot be too strongly emphasised.

There are two classes of Prime Cost which affect a Contractor :—

- (a) Cost of labour and material on individual operations or particular items.
- (b) Cost of contracts, and real accounts.

The first does not call for any special remark here apart from the fact that it is taken for granted that information of that character is absolutely necessary for estimating purposes and

TRADES PRIME COST BOOK

<i>Contract.</i>		<i>"THORNTON VILLAS."</i>										<i>"Trade Abstract."</i>	
Date.	Ref.	Book.	Pre- liminaries.	Excavator and Concretor.	Drainer.	Mason.	Bricklayer.	Carpenter.	Iron- founder.	Plumber.	Painter and Glazier.	Total.	
Aug.	25	Wages .	£ s. d. 9 0 1	£ s. d. 26 0 2	£ s. d. 1 19 6	£ s. d. 1 19 2	£ s. d. 15 11 2	£ s. d. 1 0 6	£ s. d. — — —	£ s. d. 0 10 0	£ s. d. 0 5 1	£ s. d. 55 12 9	
"	25	Machinery .	0 15 0	—	—	—	—	0 3 9	—	—	—	0 18 9	
"	152	Invoices .	6 4 9	4 7 7	2 13 1	1 19 2	69 12 8	—	0 9 6	—	—	85 6 9	
"	78	General Stores	1 4 10	—	—	—	0 4 6	—	—	—	0 4 8	1 14 0	
"	110	Timber .	2 14 1	—	—	—	—	10 2 8	—	—	—	12 16 9	
"	80	Haulage .	0 8 6	6 12 9	—	2 12 0	5 6 3	0 2 6	—	—	—	15 2 0	
"	106	Petty Cash .	0 10 8	0 6 0	—	—	0 5 8	—	—	—	—	1 2 4	
"	161	Cash .	1 0 0	—	—	—	—	—	—	—	—	1 0 0	
"	53	Transfers .	—	0 8 6	—	—	0 18 6	—	—	—	—	1 7 0	
			21 17 11	37 15 0	4 12 7	5 17 5	91 18 9	11 9 5	0 9 6	0 10 0	0 9 9	175 0 4	
	152	Credits .	—	4 15 0	—	—	9 0 11	—	—	—	—	13 15 11	
		5% Trade Exs.	21 17 11	33 0 0	4 12 7	5 17 5	82 17 10	11 9 5	0 9 6	0 10 0	0 9 9	161 4 5	
			1 1 11	1 13 0	0 4 7	0 5 11	4 2 11	0 11 6	0 0 6	0 0 6	0 0 6	8 1 4	
			22 19 10	34 13 0	4 17 2	6 3 4	87 0 9	12 0 11	0 10 0	0 10 6	0 10 3	169 5 9	

that being so it is essential that a regular system be adopted for recording the same. Such data cannot always be gathered from time-sheets, etc., but is more frequently obtained by observation on the jobs as work proceeds. Our present article is, however, chiefly concerned in the consideration of problems connected with the second class of prime cost mentioned.

There is, of course, nothing in the system we are about to consider which prevents a Contractor making special independent abstracts or data of any particular portion or class of work that he may desire to record as suggested above, or the keeping of a joiners' shop cost account, as shown on page 263. The keeping of such supplementary records must in the ordinary course of things be frequent in order to be up to date with information for estimating purposes. Some firms also keep what we will term an independent "Trades" abstract of their contracts. In this abstract the wages and material of each trade are kept separate, as shown on page 224. After completion of each contract the figures in the trades abstract book are compared with the amounts allowed for the work in the priced Bills of Quantities. This enables a Contractor to detect which trades are remunerative or otherwise under his schedule, and guides him in the main in estimating any future work.

We do not, however, recommend these abstracts, as they create a volume of figures and entail such a great amount of clerical labour that unless they are very carefully worked out no reliance can be placed upon them.

Contract and Real Accounts.—The first is confined to work for which a charge will subsequently be made, and which will rank as a business asset.

The second embodies such accounts as machinery, plant, timber, haulage, etc.

Some contractors' conceptions of a prime cost account simply amounts to the recording or extracting of time and materials for any special accounts they may require particulars of for the purpose of rendering their accounts or for future guidance in tendering. That course, no doubt, answers temporary requirements of that character, but it has no pretensions to proper prime costing as generally understood by the trade.

The crux of the whole subject of prime costing is that all debit and credit transactions should, without exception,

MONTHLY PRIME COST

	Wages.	Machin- ery.	Invoices.	General Stores.	Timber.	Haulage or Transport Book.	Petty Cash Pur- chases.	Cash
Folios	20	20	58	73	89	61	101	76
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s.
Machinery .	2 19 6	5 1 0	2 10 6	—	—	—	—	—
General Stores .	—	—	7 2 9	—	—	0 8 3	0 0 11	—
Timber .	4 5 9	—	22 17 5	—	—	0 7 6	—	—
Haulage .	17 15 7	—	11 6 0	—	—	—	0 1 9	—
Trade expenses	14 2 3	2 9 8	15 6 10	—	—	—	1 5 0	8 13 9
Plant .	—	—	40 0 0	—	—	—	—	—
Loose plant re- newals .	—	—	6 0 0	—	—	—	—	—
Motor .	—	—	2 6 0	—	—	—	—	2 2 9
Horses and carts	—	—	115 0 0	—	—	—	—	—
Mortar .	—	—	—	—	—	1 7 9	—	—
Rent .	—	—	5 6 4	—	—	—	0 2 3	—
Empties .	—	—	2 0 0	—	—	—	—	—
Sacks .	—	—	1 2 0	—	—	—	—	—
Dayworks .	25 2 6	1 9 8	0 9 0	3 12 4	3 12 2	—	—	—
Cinema .	86 6 5	1 15 2	2 16 0	1 7 1	2 2 6	1 10 0	0 2 9	—
Technical School	302 11 10	2 18 2	25 5 4	5 10 4	—	0 7 6	0 4 6	—
Hospital .	205 4 3	2 10 5	50 19 1	2 11 6	—	—	0 6 4	—
Albion Hotel .	71 1 6	1 10 5	11 2 6	—	2 0 3	6 9 0	0 7 3	—
Rolls' W. House	23 17 3	0 4 6	—	—	—	—	—	—
P.O., Hampstead	103 14 4	3 0 7	—	—	—	1 10 0	0 10 0	—
St.Mark's Church	173 5 0	2 7 3	—	—	—	—	0 1 6	—
	1030 6 2	23 6 10	321 9 9	13 1 3	7 14 11	12 0 0	3 2 3	10 15 9
	321 9 9							
	3 2 3							
	10 15 0							
Less Credit	1365 13 2							
Notes and								
Petty Cash	8 10 0							
Sales								
	1357 3 2							

ACCOUNT. JUNE 30TH

33

Debit Transfers.	GROSS.	Credit Notes.	Credit Transfers.	Petty Cash Sales.	Nett Totals.	7½% Trade Exs.	Total Debits.	Total Credits.	Cost Led- ger Folio.
48		58	48	108					
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
—	10 11	—	—	—	10 11 0	—	10 11 0	23 6 10	—
8 5 0	45 16 11	—	—	1 19 1	43 17 10	—	43 17 10	13 1 3	—
—	27 10 8	—	—	1 17 5	25 13 3	—	25 13 3	7 14 11	—
—	29 3 4	—	—	—	29 3 4	—	29 3 4	12 0 0	—
—	41 16 9	—	—	—	41 16 9	—	41 16 9	8 1 13 5	—
—	40 0 0	—	—	—	40 0 0	—	40 0 0	—	—
—	6 0 0	—	—	—	6 0 0	—	6 0 0	—	—
—	4 8 0	—	—	—	4 8 0	—	4 8 0	—	—
—	115 0 0	—	—	—	115 0 0	—	115 0 0	—	—
—	1 7 9	—	—	—	1 7 9	—	1 7 9	—	—
—	5 8 7	—	—	—	5 8 7	—	5 8 7	—	—
—	2 0 0	1 16 0	—	—	0 4 0	—	0 4 0	—	—
—	1 2 0	0 6 0	—	—	0 16 0	—	0 16 0	—	—
—	34 5 8	—	—	—	34 5 8	2 11 5	36 17 1	—	—
—	95 19 11	—	17 5 0	2 11 6	76 3 5	5 14 3	81 17 8	—	—
—	336 17 8	—	3 0 0	—	333 17 8	25 0 10	358 18 6	—	—
—	261 11 7	—	6 10 0	—	255 1 7	19 2 7	274 4 2	—	—
0 0 0	103 10 11	—	22 10 0	—	81 0 11	6 1 7	87 2 6	—	—
—	24 1 9	—	—	—	24 1 9	1 16 1	25 17 10	—	—
2 10 0	131 4 11	—	—	—	131 4 11	9 16 11	141 1 10	—	—
—	175 13 9	—	22 10 0	—	153 3 9	11 9 9	164 13 6	—	—
1 15 0	1493 11 2	2 2 0	71 15 0	6 8 0	1413 6 2	81 13 5	1494 19 7	137 16 5	—
					Less total	Credits	137 16 5		
							1357 3 2		

be properly assigned to the respective accounts they concern, whether contract or real. Unless this is done, a satisfactory prime cost account is not obtained.

The system we are about to consider involves much care and attention, but has the compensation of being reliable when properly carried out.

A system of prime cost to be of any value must be one which can be relied upon.

With regard to "real" accounts these should bear a profit on their working cost in precisely the same manner as contract accounts, so that if the trading of any particular department does not produce satisfactory results enquiries should be instituted in order to detect the cause and provide a remedy for the same.

We give on page 227 an example of a monthly cost account. It will be seen that the total debits and credits for both real and contract accounts are given. These totals are eventually posted to their respective accounts in the Prime Cost Ledger, where the Contractor gathers his information regarding the cost of his various undertakings. The totals from the various books (wages, etc.) are placed in the order shown for convenience, when details have to be got out for any extra work or for some particular job. The cost clerk, in dealing with the time-sheets, usually obtains from them a very graphic description of the work executed, and also a good idea of what materials ought to be booked up and accounted for. It provides him with an incentive to guard against any omissions in the booking up of materials which is not an unknown occurrence in the trade.

To illustrate this point we will assume an "extra" order has been given by the Architect to remove a defective chimney-pot and replace with a new one and generally make good. When making up an account for this work, and after reading through the time-sheets, the following questions would present themselves to the mind of any practical cost clerk, and the answers to them should readily be forthcoming when all details have been collected from the various books connected with the prime cost account.

- (a) What assistance in labour did the mason have from other sources?
- (b) Has the new chimney-pot been charged?

- (c) How much cement, mortar, etc., was used ?
- (d) If any other materials used, such as lead for flashings, etc. ?
- (e) What ladders, scaffolding, etc., were used, and what charge should be made for their use ?
- (f) Was this plant all returned, and where to ?
- (g) Would the defective chimney-pot be of any further use ?
If so, has it been returned to the yard and credit made for it ?

Note.—A defective pot does not necessarily mean a broken one. It may be the length, size, or pattern does not suit the requirements. It may, therefore, be usable elsewhere.

We will now proceed to deal with each book individually.

CHAPTER LII

WAGES BOOK

A CONTRACTOR'S Wages Book usually deals with two classes of workmen, namely :—

- (a) Those working at headquarters or directed therefrom, and
- (b) Workmen at specific contracts.

Separate time-sheets are necessary for workmen at headquarters, and these should be entered up into the wages book in detail as shown in example on page 232, but for the contracts in hand it is only necessary to enter into the wages book the totals of the various pay sheets sent in by the foreman. Each foreman having been provided with a stock of specially printed pay sheets, is required to make a weekly return of the workmen's hours, subs., and expenses. The actual working out or calculation of the wages due to the workmen being, of course, left to the office staff to attend to.

When the total wages for the week has been arrived at, a cheque should be drawn for the amount.

There are a few points regarding the preparation of a wages list which it would be well to emphasise in order to obtain the most satisfactory results when making up prime cost details later on.

- (a) Each class of tradesmen should be kept together whenever possible, headed of course by its respective foreman.
- (b) Improvers and apprentices should follow (not precede or intervene with) tradesmen of their particular class.
- (c) Whenever practical, labourers should be entered immediately after the particular tradesmen they are associated with.
- (d) Expenses passed for payment, such as train fares, lodgings, etc., should be entered into the expenses column in wages book.
- (e) With perhaps a few exceptions, such as boys under sixteen, etc., a 10d. health and $1\frac{1}{3}$ unemployment

stamp must be provided for every workman engaged in the building trade, the employer's portion being 8d. and the employee's 7d.*

It will be observed from our example that the contingency of recovering the full value of the insurance stamps that have to be purchased is met, in the first place, by the column showing the amount deducted from the workmen, and in the second place by the inclusion of the employer's portion in a lump sum at the foot of the wages. With regard to example wage sheet, it is not absolutely necessary to include net wages column in the wages book. It is given here in order to demonstrate to the reader more fully how the balance is made up. Immediately after the wages lists are completed, the pay bags should be made out, and on them the various details should be given so that the workman can see exactly how his wages are made up. For example, Francis the Labourer's pay bag should bear the following :—

	£	s.	d.
45 hours	5	1	3
Exs.	0	2	3
	<hr/>		
	£	s.	d.
Sub.	0	10	0
Ins.	0	0	9
	<hr/>		
	0	10	9
	<hr/>		
	£4	12	9

The reader will note that £1 17s. 6d. subs. and £1 16s. 0d. insurance stamps will revert to the office when the wages have been put up ready for payment.

Wages now being considered as duly paid, we will turn our attention to the analysis of same. Each workman's time should be properly analysed at the foot of his time-sheet in the special column provided for that purpose, as shown on W. Bough, machinist's, time-sheet, page 235. It will be observed that the full time worked by Bough is entered into the hours column. In the machinery column is entered the actual time occupied by him on the machines.

The term machines applies only to machinery driven by gas, steam, or other motive power. Hand morticing, and

* The unemployment stamps have recently been increased to 1/7 for men and 9½d. for apprentices.

20

WAGES

WEEK ENDING 29th JUNE

Trade.	Name.	Exs.	Hours.	Rate.	Amount.	Subs.	Insur- ance.		Nett Wages, etc to pay in Yard.		
							H.	U.			
					£ s. d.	£ s. d.			£ s. d.		
Foreman joiner .	Williams, F.	2/-	44	130/-	6 10 0	—	5	4	6 11		
Machinist .	Borough, W.	—	44	2/7	5 13 8	—	5	4	5 12 1		
Joiner .	Mathews, E.	—	44	2/6	5 10 0	—	5	4	5 9		
" .	Warden, F.	—	44	2/6	5 10 0	—	5	4	5 9		
" .	Brown, M.	—	16	2/6	2 0 0	—	5	4	1 19		
Improver .	Owen, T.	—	44	1/6	3 6 0	—	5	4	3 5		
Apprentice .	Cleaves, T.	—	41	15/-	0 14 0	—	5	4	0 13		
Bricklayer .	Haines, A.	8d.	43	2/6	5 7 6	0 5 0	5	4	5 2		
" .	Archer, F.	—	42	2/6	5 5 0	—	5	4	5 4		
" .	Boulton, A.	—	43	2/6	5 7 6	0 2 0	5	4	5 4		
Apprentice .	Cotterell, F.	—	43	17/-	0 16 7	—	5	4	0 15 10		
Foreman plumber	Mainwaring, W.	—	44	130/-	6 10 0	—	5	4	6 9		
Plumber .	Griffen, H.	—	44	2/6	5 10 0	—	5	4	5 9		
" .	Smith, F.	—	38	2/6	4 15 0	0 3 0	5	4	4 11		
Apprentice .	Cloves, E.	—	40	13/-	0 11 10	—	5	4	0 11		
Plasterer .	Howells, C.	1/3	41	2/6	5 2 6	—	5	4	5 3		
" .	Walby, G.	—	42	2/6	5 5 0	0 6 0	5	4	4 18		
Painter .	Jenkins, T.	—	44	2/6	5 10 0	—	5	4	5 9		
" .	Wells, J.	—	43	2/6	5 7 6	0 1 0	5	4	5 5		
" .	Norton, W.	—	44	2/6	5 10 0	—	5	4	5 9		
Improver .	Ford, F.	—	44	1/3	2 15 0	—	5	4	2 14		
Haulier .	Price, W.	1/-	44	90/-	4 10 0	—	5	4	4 10		
Labourer .	Bennett, T.	—	42	2/3	4 14 6	—	5	4	4 13		
" .	Francis, F.	2/3	45	2/3	5 1 3	0 10 0	5	4	4 12		
" .	Hall, W.	—	8	2/3	0 18 0	0 8 0	—	—	0 10		
Yard boy .	Griffiths, J.	—	44	20/-	1 0 0	0 2 6	—	—	0 17		
				E. s.	0 7 2						
Insurance stamps			7/2				1	17 6			
24 @ 10d.	£1 0 0	} Employer's portion of Insur- ance . . . }					Office subs.		1 17 0		
24 @ 8d.	0 16 0				0 18 0		Insurance stamps }		1 16 0		
	£1 16 0				110 6 0				110 6 0		
P.O. Hampstead, Wages Sheet					55 2 0						
St. Mark's, Brixton					37 5 6						
Technical School					89 2 0						
Hospital, Blackheath					15 12 9						
					307 8 3						

(ANALYSIS)

20

												THIS WEEK'S SUMMARY.		
Machinery.	Trade Exs.	Dayworks.	Cinema.	Technical School.	Blackheath Ho-pital.	Albion Hotel.	Rolls' Warehouse.	P.O., Hampstead.	Timber.	Haulage.	St. Mark's, Brixton.	Contracts, etc.	Wages.	Machin- ery at 2/6 Hour.
2	5	1	4	5	8	7	3	1	8	—	—	Machinery .	£ s. d. 1 3 10	£ s. d. — — —
6	7	3	8	4	12	2	—	—	2	—	—	Trade Exs. .	4 2 10	0 11 3
—	—	5	10	5	22	—	—	—	—	2	—	Dayworks .	16 1 1	0 6 3
—	—	5	11	6	22	—	—	—	—	—	—	Cinema .	27 11 11	0 13 9
—	—	—	—	—	16	—	—	—	—	—	—	Technical		
—	—	—	10	5	29	—	—	—	—	—	—	Schools .	94 13 8	0 10 0
—	7	4	7	8	15	—	—	—	—	—	—	Blackheath		
—	—	43	—	—	—	—	—	—	—	—	—	Hospital .	34 19 1	0 18 9
—	—	42	—	—	—	—	—	—	—	—	—	Albion Hotel	11 16 3	0 2 6
—	—	19	17	7	—	—	—	—	—	—	—	Rolls' Ware- house .	18 3 4	—
—	—	43	—	—	—	—	—	—	—	—	—	P.O. Hamp- stead .	55 5 0	—
—	—	—	—	—	—	—	44	—	—	—	—	Timber .	1 9 0	—
—	—	—	—	—	—	—	44	—	—	—	—	Haulage .	4 16 9	—
—	—	—	—	—	—	—	38	—	—	—	—	St. Mark's, Brixton .	37 5 6	—
—	—	—	—	—	—	41	—	—	—	—	—			
—	—	—	—	—	—	42	—	—	—	—	—			
—	—	—	44	—	—	—	—	—	—	—	—			
—	—	—	43	—	—	—	—	—	—	—	—			
—	—	—	44	—	—	—	—	—	—	—	—			
—	—	—	44	—	—	—	—	—	—	—	—			
—	—	—	—	—	—	—	—	—	—	—	—			
—	10	—	8	12	10	—	2	—	—	—	—	Assumed summary for the month of June		
—	—	—	—	—	45	—	—	—	—	—	—			
—	8	—	—	—	—	—	—	—	—	—	—			
5	10	10	5	6	8	—	—	—	—	—	—			
Exs. 2/-	—	—	—	8d.	2/3	1/3	—	—	—	1/-	—			
2d.	6d.	2/11	4/3	11d.	3/6	1/8	3/1	1d.	2d	9d.	—	Machinery .	£ s. d. 2 19 6	£ s. d. 5 1 0
—	—	—	—	—	—	—	—	55/-	1/-	37/-	—	Haulage .	17 15 7	—
—	—	—	—	—	—	—	—	2/-	1/-	5/6	—	Trade Exs. .	14 2 3	2 9 8
—	—	—	—	—	—	—	—	—	—	—	—	Dayworks .	25 2 6	1 9 8
—	—	—	—	—	—	—	—	—	—	—	—	Cinema .	86 6 5	1 15 2
—	—	—	—	89/-	15/-	—	—	—	—	—	—	Technical		
—	—	—	—	—	—	—	—	—	—	—	—	School .	302 11 10	2 18 2
—	—	—	—	2/-	12/9	—	—	—	—	—	—	Hospital,		
—	—	—	—	—	—	—	—	—	—	—	—	Blackheath	205 4 3	2 10 5
—	—	—	—	—	—	—	—	—	—	—	—	Albion Hotel	71 1 6	1 10 5
—	—	—	—	—	—	—	—	—	—	—	—	Rolls' Ware- house .	23 17 3	0 4 6
—	—	—	—	—	—	—	—	—	—	—	—	P.O. Hamp- stead .	103 14 4	3 0 7
—	—	—	—	—	—	—	—	—	—	—	—	St. Mark's, Brixton .	173 5 0	2 7 3
—	—	—	—	—	—	—	—	—	—	—	—	Timber .	4 5 9	—

mitreing, machines, etc., are now considered part of the essential equipment of all modern joiners' shops, and therefore do not incur any special charge. Each job should be given a number by the shop foreman, and the numbers quoted on the time-sheet (as shown on Bough's sheet). This is for the purpose of abstraction into joiners' cost book (see page 263). It is often a very difficult matter to get joiners and others to realise the importance of giving an accurate and intelligible record of their work on their time-sheets. Strict instructions should therefore be given to direct their attention to this necessity.

The responsibility for the supervision of workmen's time-sheets primarily rests with their respective foremen, but as some foremen often appear to be as lax and indifferent as the workmen themselves it is advisable to have occasional checks made by the office staff to insure that things are not allowed to drift.

Prime cost accounts worked on badly kept time-sheets is misleading, and its value very much discounted, if not altogether negligible.

We will now give our attention to the analysis of the wages book shown on page 232. It will be unnecessary here to give details of each time-sheet. We gather from the foreman's, machinist's, and yard boy's time-sheets that they were engaged in repairing and adjusting the machinery, the cost of which we have debited to the machinery account. The foreman, machinist, etc., were also occupied on sundry alterations within the yard, the cost of which has been put to trade expenses account. The other columns refer to building contracts in hand. It will be seen in the analysis that the cost of Workmen's Compensation Insurance has been apportioned to each contract or job in proportion to the wages paid on it. Workmen's out-of-pocket expenses are debited to the works for which the outlay was incurred.

It is not customary to deal with the office salaries in the general wages book. A separate book is usually kept for this purpose. The amount paid under this heading should be debited direct to trade expenses account.

SURREY & KENT, Contractors, BIRMINGHAM.
 NAME, W. Bough. TRADE, Machinist. WEEK ENDING June 29th.

	Contract.	Machine Time.	Hour.	Description of Work.	Job.	SUMMARY.	
						Machy.	Hrs
THUR.	Timber . Machinery . Dayworks . Albion Hotel .	— — 2½ —	2 2½ 3 ½	Picking out strips for stock moulding Repairing shafting . Robin's 3-framed L. & B. doors . Centres	— — 221 222		
FRID.	Cinema . Machinery . Trade Exs. .	4 — —	6½ 1 ½	Sashes and frames . Sharpening moulding irons . Roof timber for yard repairs .	223 — —		
SAT.	Albion Hotel . Machinery . Cinema .	1 — 1½	1½ 1 1½	Centres Repairing belting . Sashes and frames .	222 — 223		
MON.	Trade Exs. . Technical School	4½ 1½	6½ 1½	Roof timber yard repairs Skirting and map rail . . .	— —		
TUES.	Technical School Machinery . Blackheath Hos- pital . . .	2½ — 2	2½ 1½ 4	Skirting and map rail . Adjusting gas-engine . Teak doors and frame . . .	— — 224	Timber . Machinery . Daywork . Albion Hotel . Cinema . Trade Exs. . Technical School Blackheath Hospital .	2 6 3 2 8 7 4 12
WED.	Blackheath Hos- pital . . .	5½	8	Teak doors and frame . . .	224		
		25	44	Hours @ 2/7 = £5 13 8	—	25	44

CHAPTER LIII

MACHINERY

As indicated in the previous chapter the information for the analysis under this heading is gathered from the time-sheets of the machinists or other workmen who have occasion to use machines "driven by power." Many firms have no properly defined system or method of charging up machinery. There are no two firms whose circumstances are identical in regard to equipment or other essentials, yet the problem is, in the light of experience, one capable of a fairly accurate solution in every case. It may be that a machinist is not always engaged on actual machine work. Often he may have to do a lot of necessary odd jobs which cannot be charged to any particular contract. Therefore a definite system of charging for actual contract and other work should be devised.

The following formula has, after many years' experience, been found very satisfactory in dealing with the charging of machine work :—

"Debit to the various jobs all machinists' time in the same manner as other workmen's sheets are dealt with. Place in a column headed "Machinery" all the time actually worked by the machines (see Bough's time-sheet, page 235), and then charge this machine time at a 'fixed rate' per hour to cover the running cost."

It is the "fixed" rate just referred to that creates a difficulty with many firms. Some contend, with some justification, that each machine should be charged according to its initial cost, repair, upkeep, power consumed, etc., but for general cost purposes a flat rate of so much per hour for all machinery is considered the most satisfactory method of meeting the difficulty.

We will assume, therefore, that after taking into consideration the cost of the general upkeep of machinery that the preceding year's running worked out at an average cost of 2s. 6d. per hour. This figure can then be used with confidence as a basis for the charges for the ensuing year, always provided

that nothing exceptional occurs, in the meantime, in the prices of any of the chief items that go to make up the cost, such as coal, gas, electric power, etc.

To arrive at the average cost, take the total number of hours worked by the machines during the year, and divide same by the total running cost for the period, e.g.

If the running cost of machinery plus allowance for wear and tear, depreciation, etc., amounts to £125, and the total number of hours the machines have been in use throughout the year is 2000, the average works out at 1s. 3d. per hour.

It is only by actual experience that one can ascertain fairly accurately the cost of any operation, and we think that simplicity of the above method should appeal to those in search of a really reliable arrangement for dealing with this business problem. It has this recommendation, that provided the time-sheets are properly and regularly filled up, there is no risk of any work executed on the machines not being accounted for. Motive power, under the most favourable conditions, is too costly an item to be neglected or overlooked in respect to the charging of same. It is not in our province here to enter into the controversial questions of whether steam, gas, electric, oil, or any other power is the most suitable, adaptable, or economical, for a Contractor's use. All claim various advantages under different conditions, but the method of dealing with the working cost of either does not materially alter the system just referred to.

CHAPTER LIV

INVOICES

THE next subject connected with our prime cost article deserves more attention than is usually devoted to it. The duty of checking invoices is too often relegated to a junior who has little or practically no experience, with what result can easily be imagined by any competent person, as such work entails other obligations besides the elementary process of checking calculations.

Invoices when received should be put away in a special file or cabinet until such time as they can receive attention. For preference, a file with alphabetical divisions, like the "Amburg" patent indexing file, No. 103T, should be used. A similar file should also be kept for delivery notes received when goods are delivered. Should a priced invoice only be sent in for any goods supplied, a copy of same, omitting the prices, should be sent to the foreman of the contract to which the goods are to be delivered. Before entering up an invoice into the invoice book, it should be thoroughly checked and analysed.

It should be an understood rule that an official order be given for all goods or work ordered by the firm. It is, however, not always practical to insist on this rule being complied with, as often through urgent necessity a verbal order has to be given at some distant place, or over the 'phone, in order to prevent delay, but notwithstanding these circumstances it should be insisted upon that full particulars, including prices of such orders, be noted up in the order book by the responsible party at the very earliest opportunity so that the information will be available for the invoice clerk when the time arrives for dealing with the invoice for same.

The leading idea is that no work or goods should be ordered without keeping an intelligent record of the transaction. When this is done all doubts are practically disposed of, and besides, the method suggested greatly minimises the work of checking invoices.

About the end of the first week in each month the invoice

file and order book should be looked through and a post card or telephone message sent to all firms whose invoices have not been received for the preceding month. This precautionary measure assures the majority of invoices being rendered in good time for inclusion in the current prime cost accounts.

The following is a short summary of the duties entailed in checking invoices :—

(a) The invoice, order, and the signed delivery notes from the foreman should be compared, and any discrepancy or overcharge thoroughly investigated. The order should then be crossed through, as an indication that the goods have been invoiced, and the order number placed on the invoice in a prominent position. In no case must the invoice be passed unless there is ample proof that the goods have come to hand, or that the work charged for has been duly executed.

(b) The foreman's weekly material sheets should also be examined, and the goods in question marked through if found to agree with invoice.

(c) Thoroughly check all extensions and verify quantities and weights. If there are any breakages or shortages "in transit" the attention of the Railway Company should be immediately drawn to it and senders advised. The matter should not be lost sight of until put in order.

(d) Labels and consignment notes should be sent to the foreman for all empty boxes, packings, sacks, etc., invoiced, which are ready to be returned. The Railway Company should be advised to collect them and an advice sent consignees with a request for a "credit note" when to hand.

(e) To prevent any possibility of an oversight occurring when payment is being made, all "Trade" discount should be deducted from invoices before passing them through the invoice book. By this method the contract affected will receive full benefit of such special discount, which is as it should be. Any special "Cash" discount, to which the goods are subject should be clearly noted in red ink at the foot of the invoice and a pencil note made of it in the creditor's folio in the ledger so as to avoid it being overlooked when dealing with the payment of same. Again, when invoices are subject to special cash discount if paid within a specified time, a record should be made in the manager's or cashier's diary (or daily reminder) to prevent the matter escaping attention.

If any special or exceptional circumstances arise (before such date) which prevent a complete settlement being made, a cheque should be sent on account (i.e. if circumstances permit) so that when matters have been put in order and the account can with safety be settled, the cash discount can then be fully claimed.

(f) A summary of the various charges to contracts, etc., should be placed at the foot of each invoice ready for analysis in the invoice book.

In order to make the foregoing comments clear, we give an illustration of an invoice book (see page 242), followed by a few specimen invoices and credit notes (see pages 244 to 248), which are ready for entry into the invoice book, and which we will follow up with a short survey.

These examples are also given to enable us to touch upon some of the different type of accounts which have periodically to be dealt with in a Contractor's office.

The reference L.B.89 given on Invoice No. 1 signifies Letter Book Fol. 89, and reference 0/709 on Invoice No. 2 signifies Order No. 709.

Invoices No. 1 and 2 are subject to a special cash discount and are marked accordingly at the foot. Invoice No. 2 is also subject to 10 per cent trade discount, which, it will be noted, has been deducted.

The crusher charged on Invoice No. 1 was purchased specially for the Albion Hotel contract, as a large quantity of ballast was required for concrete work. In the circumstances it is felt that it is only fair that the contract should bear a portion of the initial outlay for the machine, the remainder, of course, being placed to plant account.

Full value will be allowed for the empties charged on Invoice No. 2 when returned. In some cases senders only allow a portion of their charge for empties when returned. In such instances the empties' account should only be debited with that portion the contract for which the goods are required bearing the difference.

The cottage adjoining the yard No. 15, Hay Street, mentioned on Invoice Nos. 3 and 4, is let to a person whose weekly rent is credited to Rent Account. We will, therefore, debit that account with all ground rent and rates charged on this property.

Instead of issuing monthly or quarterly statements as now practised by most manufacturers and merchants, some firms adhere to the antiquated custom of bringing forward on their invoices any account or balance of account that may at the time be due to them on previous transactions. It, therefore, behoves anyone checking invoices to see that such items are struck out, to avoid the possibility of the amount being credited and perhaps paid twice. Invoices Nos. 5 and 6 are illustrations of this type of account.

Detailed vouchers should be provided for all purchases, etc. It will, therefore, be necessary in cases where no accounts are rendered for the invoice clerk to make out and file a document giving full details of the transaction.

Architects often fail to render accounts for their charges, and many firms do not make a practice of issuing credit notes, simply crediting amounts in their monthly or quarterly statements, and it is to meet such cases that the above suggestion is made.

It is important that matters of this kind should not be allowed to drift, as mistakes and misunderstandings are likely to arise in consequence. One should aim at finality as much as possible in all transactions in order that the prime cost account will show a true and up-to-date statement of affairs.

We do not think Invoices Nos. 10 and 11 require any explanation.

The barrows charged on Invoice No. 12 being required to replace others are charged to "Loose Plant Renewals Account," which will eventually rank amongst the charges against profits.

Before concluding, we think we should say a word deprecating the practice prevalent with some firms of returning invoices when remitting cheques. Original vouchers should not leave the office files once they have been properly entered up, unless under special circumstances.

INVOICES					ANALYSIS				
Invoice No.	Date.	Name.	Ledger Folio.	Amount.	Machinery.	Albion Hotel	Plant.	Day-work.	
I	June 30	Mainwaring Bros. .		£ s. d. 53 0 6	£ s. d. 2 10 6	£ s. d. 10 10 0	£ s. d. 40 0 0	£ s. d. —	
2	„ 26	Goldsworthy & Co. .		31 5 2	—	—	—	0 9 0	
3	„ 24	Seabourne Estate Office		9 5 0	—	—	—	—	
4	„ 24	Seabourne Corporation		11 0 8	—	—	—	—	
5	„ 14	Parker & Smith .		2 13 6	—	—	—	—	
6	„ 5	Smith & Son .		2 14 0	—	—	—	—	
7	„ 20	Bostwick & Son .		7 3 6	—	—	—	—	
8	„ 15	Jackson, Ltd. .		22 17 5	—	—	—	—	
9	„ 2	H. G. Wilson .		50 0 0	—	—	—	—	
10	„ 28	A. Thomas .		1 10 0	—	0 12 6	—	—	
11	„ 7	B. Hopkins .		65 0 0	—	—	—	—	
12	„ 8	Hatton & Co. .		56 0 0	—	—	—	—	
13	„ 12	Jack ll & Co. .		9 0 0	—	—	—	—	
				321 9 9	2 10 6	11 2 6	40 0 0	0 9 0	
CREDITS									
14	June 29	Goldsworthy & Co. .		1 12 0	—	—	—	—	
15	„ 20	Smith & Son .		0 4 0	—	—	—	—	
16	„ 30	Bostwick Co. .		0 6 0	—	—	—	—	
				£2 20	—	—	—	—	

Folio 33 Cost Book

INVOICES

58

Blackheath Hospital.	Technical School.	Empties.	General Stores.	Rent.	Trade Exs.	Haulage.	Motor	Sacks.	Cinema.	Timber.	Horses and Carts.	Loose Plant Renewals/c
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
0 19 1	25 5 4	1 12 0	2 19 9	—	—	—	—	—	—	—	—	—
—	—	—	—	2 10 0	6 15 0	—	—	—	—	—	—	—
—	—	—	—	2 16 4	8 4 4	—	—	—	—	—	—	—
—	—	—	—	—	0 7 6	2 6 0	—	—	—	—	—	—
—	—	0 8 0	—	—	—	—	2 6 0	—	—	—	—	—
—	—	—	4 3 0	—	—	—	—	1 2 0	1 18 6	—	—	—
—	—	—	—	—	—	—	—	—	—	22 17 5	—	—
50 00 0	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	0 17 6	—	—	—
—	—	—	—	—	—	—	—	—	—	—	65 00 0	—
—	—	—	—	—	—	—	—	—	—	—	50 00 0	6 00 0
—	—	—	—	—	—	9 00 0	—	—	—	—	—	—
50 19 1	25 5 4	2 00 7	29 5 6 4	15 6 10	11 60	2 60	1 20	2 16 0	22 17 5	115 00 0	6 00 0	—
—	—	1 12 0	—	—	—	—	—	—	—	—	—	—
—	—	0 4 0	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	0 60	—	—	—	—
—	—	1 16 0	—	—	—	—	—	0 60	—	—	—	—

INVOICES

No.	Date.	Name.	Order.	Goods, etc.	£	s.	d.
1	June 30	Mainwaring Bros., Engineers	728	To repairs to shafting	}	2	10
				„ Repairs to engine, 1 steel pin and roller .			
				„ Repairs to engine magneto .			
			L.B. 89	„ 1 new stone crusher, delvrd. Albion Hotel .			
							0
							53 0 6

Machinery 2 10 6
 Albion Hotel 10 10 0
 Plant . 40 0 0

£53 0 6

Memo.
 7½% discount if paid
 by 20th July.
 Afterwards nett

2	June 20	Goldsworthy & Co., Factors	709	4 sets mortice furniture . . .	2/6	0	10	0
			710	51 brass circular flange plates .	5d.	1	1	3
			717	Polished brass-cased desk rails, as estimate . . .		28	1	6
	June 26		749	6 doz. brass sash-lifts, No. 2730	7/-	2	2	0
				5¼ doz. brass pull-down rings	4/6	1	3	8
				Postage		0	0	9
						32	19	2
				Less 10% (say)		3	6	0
						29	13	2
				2 cases @ 10/- each (No. 610 & 611)	}	1	12	0
				1 cask @ 12/- (No. 618)				
						31	5	2

Dayworks . . 0 9 0
 Blackheath Hosp. . 0 19 1
 Technical School . 25 5 4
 General Stores . 2 19 9
 29 13 2
 Empties 1 12 0
31 5 2

2½% dis.
 Monthly ¼%

INVOICES

245

No.	Date.	Name.	Order.	Goods, etc.	
3	June 24	Seabourne Estate Office		$\frac{1}{2}$ year's ground rent of 15 Hay St. . $\frac{1}{2}$ year's ground rent of Yard St. . Rent $\frac{a}{c}$. 2 10 0 Trade exs. 6 15 0 <u>£9 5 0</u>	£ s. d. 2 10 0 6 15 0 <hr/> 9 5 0
4	June 24	Seabourne Corporation		<i>Asst.</i> General District and Poor Rates for half year, 15 Hay St., @ £13 Water Rate @ 5% per an. General District and Poor Rates, Hay St. Yard @ £30 Water Rate @ 5% per an. Gas consumed, 12,000 cube feet 1 quarter's rent for 5-light meter . Rent $\frac{a}{c}$. 2 16 4 Trade exs. 8 4 4 <u>£11 0 8</u>	3/10 2 9 10 0 6 6 3/10 5 15 0 0 15 0 2/9 1 13 0 0 1 4 <hr/> 11 0 8
5	June 14	Parker & Smith, Wheelwrights, etc.	L.B. 73	$\frac{a}{c}$ Rendered— New pair shafts to mortar cart, as estimate . . Repair to tyre of hand truck . Haulage . 2 6 0 Trade exs. 0 7 6 <u>£2 13 6</u>	6 5 0 2 6 0 0 7 6 <hr/> 8 13 6 2 13 6

No.	Date.	Name	Order.	Goods, etc.		£ s. d.
6	June 1	Smith & Son, Motor Engineers	700	Balance of empties to return—		2 2 6
				8 gallons petrol .	2/9	1 2 0
				4 tins	2/-	0 8 0
	June 5		727	1 exhaust spring .		0 1 6
				Repairs to pedal- brake shoes, re- padding and fix- ing, taking off rear brake shoes and do. do. . . .		1 2 6
				Motor $\frac{a}{c}$ 2 6 0		4 16 6
				Empties . 0 8 0		2 14 0
				<u>£2 14 0</u>		
7	June 19	Bostwick & Sons, Builders' Merchants	731	1 ton cement .		3 17 6
				11 bags	2/6	1 7 6
	June 20		754	350 10 × 5 × 2 blue- chequered bricks .	110/-	1 18 6
				General		<u>7 3 6</u>
				Stores . 4 3 0		
				Sacks . 1 2 0		
				Cinema . 1 18 6		
				<u>£7 3 6</u>		
8	June 15	Jackson, Ltd., Timber Merchants	733	1/10' 2/11' 3/16'		
				2/18' 4" × 11" Coln.	£	
				Pine 0-0-25 $\frac{9}{12}$.	42/10/-	9 2 5
				2/17' 2/18' 3" × 4"		
				Red 0-0-4 $\frac{8}{12}$.	33/10/-	1 3 9
				10/13' 16/14' 34/15'		
				12/16' 2" × 4" Red		
				0-1-12 $\frac{8}{12}$. . .	34/0/-	12 1 9
				Sawing 116 ft. @ .	1/9	0 2 0
				Labour charges and delivery		0 7 6
				Timber $\frac{a}{c}$ £22 17 5		<u>22 17 5</u>

INVOICES

247

No.	Date.	Name.	Order.	Goods, etc.		£ s. d.
9	June 2	H. G. Wilson, Architect		To Surveyor's Fees and lithography for Blackheath Hospl. Blackheath Hospl. <u>£50 0 0</u> Paid June 15.		<u>50 0 0</u>
10	June 1 & 2	A. Thomas	See Haul- age Book	To haulage, as agreed Albion Hotel . 0 12 6 Cinema . 0 17 6 <u>£1 10 0</u>		<u>1 10 0</u>
11	June 7	B. Hopkins, Hauliers, &c.		To one dark bay horse, "Drake" Horses and carts $\frac{a}{c}$ <u>£65 0 0</u>		<u>65 0 0</u>
12	June 8	Hatton & Co., Wheel- wrights	L.B. 64	To 1 new light trol- ley, as estimate . 4 barrows . . . Horses and carts $\frac{a}{c}$. 50 0 0 Loose plant renewals $\frac{a}{c}$ 6 0 0 <u>£56 0 0</u>	30/-	<u>50 0 0</u> <u>6 0 0</u> <u>56 0 0</u>
13	June 12	Jackall & Co., Hay Merchants	766	1 ton clover hay . Haulage $\frac{a}{c}$ <u>£9 0 0</u>		<u>9 0 0</u>

CREDIT NOTES

58

	No.			
June 29	14	Goldsworthy & Co., London	2 cases @ 10/- each 1 0 0 1 cask . . . 0 12 0 <i>Advice No. 14.</i> Empties $\frac{a}{c}$	£ s. d. 1 12 0
„ 30	15	Smith & Son, Birmingham	2 tins @ 2/- . . . <i>Advice No. 20.</i> Empties $\frac{a}{c}$	0 4 0
„ 30	16	Bostwick & Co., Wolverhampton	3 bags @ 2/- . . . <i>Advice No. 30.</i> Sacks $\frac{a}{c}$	0 6 0
			SUMMARY. Empties . . . 1 16 0 Sacks . . . 0 6 0 <u>£2 2 0</u>	<u>2 2 0</u>

CHAPTER LV

GENERAL STORES BOOK

ALL material (with the exception of timber) sent to outside jobs should be charged up in this book (see example, page 250).

The particulars for this book are chiefly gathered from the office delivery note book. A rule should be established that no material or finished goods (such as joinery, etc.) be allowed to leave the yard without a delivery note first being made for it at the office. A system should be adopted which would make it practically impossible for goods to be taken from stock without being charged up in some way or other. It is essential that the risk of such omissions should be reduced to a minimum.

Regarding the pricing of the various items in the general stores book, a frequent error is to do so on invoice costs. Several contingencies have to be taken into account. For instance, cartage, carriage, handling of the goods, interest on the outlay of stock, depreciation, general trade expenses, the quantities supplied, etc., all of which have a bearing on the price. Local conditions and current prices have also to be taken into account. For general purposes, however, a certain fixed plan should be adopted. A satisfactory method is to make up a price list from recent invoices, adding, say, 25 per cent on them to meet the contingencies just referred to, special or exceptional items to be dealt with on their own particular merits. On page 125 we gave an extract from a specimen price list as an indication of the ground such a list should cover. Our example on page 250 gives an abridged record of a month's entry in a general stores book.

GENERAL STORES, June 30th.

			£	s.	d.	£	s.	d.
DAYWORKS	2	Gallons varnish . . .	16/-	1	12	0		
	6	Sheets glass-paper . . .	1d.	0	0	6		
	14	lbs. Duresco . . .	8d.	0	9	4		
	$\frac{1}{2}$	Gallon turps.	8/-	0	4	0		
	28	lbs. ready-mixed paint . .	10d.	1	3	4		
	4	lbs. dryers	5d.	0	1	8		
	1	sq. 18" × 18" 21 oz. glass = 2' 3" super	8d.	0	1	6		
							3	12 4
CINEMA .	4	yds. 2" R.W. pipe . . .	3/-	0	12	0		
	1	Toe	—	0	1	6		
	4	Pipe nails	—	0	0	1		
	3	Pipe hooks	—	0	0	6		
	$\frac{1}{2}$	cwt. putty	26/-	0	13	0		
							1	7 1
BLACK- HEATH HOSPITAL .	—	1-0-8 sheet lead . . .	42/-	2	5	0		
	20	lbs. Silicate cotton . . .	1 $\frac{1}{2}$ d.	0	2	6		
	$\frac{1}{2}$	bag cement	8/-	0	4	0		
							2	11 6
TECHNICAL SCHOOL .	1	bag 3 $\frac{1}{2}$ " nails	—	1	16	0		
	28	lbs. copper slate nails . .	1/10	2	11	4		
	40	12" × 14" slates (second- hand)	6d.	1	0	0		
	4	Lead soakers	9d.	0	3	0		
							5	10 4
							<u>13</u>	<u>1 3</u>

SUMMARY.

	£	s.	d.
Dayworks	3	12	4
Cinema	1	7	1
Blackheath Hospl. . .	2	11	6
Technical School . . .	5	10	4
	<u>13</u>	<u>1</u>	<u>3</u>

CHAPTER LVI

TIMBER BOOK, OR SHOP FOREMAN'S TALLY BOOK

ALL timber taken from stock, whether used for joinery or any other purpose, should be entered into this book. The book should be in duplicate and specially ruled.

When a shop foreman places joinery work in hand he usually makes a drawing of the full-size sections of same on a long sheet of paper or board called a rod. From this rod he compiles a list or schedule of the timber, mouldings, etc., necessary for the construction of the work. This list is usually termed a tally. The rod and tally are handed to the joiner deputed to execute the work, and he in turn takes it to the machinist. They both collect or assemble the various items together, ready for a start at the bench.

A tally is also made out for all sundry timber required.

At the end of the month or period for making out the prime cost, the tally book is sent into the office to be worked out and priced up. It is advisable to keep two tally books : one should be in use with the foreman while the other is in the office.

On page 252 we give a specimen page of this book, and the reader will kindly note the following rules are observed :—

- (a) Battens and mouldings are carried out in lineal measure.
- (b) Timber 2" thick and under is worked out as 1" super.
- (c) Timber above 2" sq. is cubed.
- (d) The eighth part of an inch is treated as $\frac{1}{4}$ " thus :—

$4\frac{5}{8}" \times 5\frac{7}{8}"$ would be worked out as $4\frac{3}{4}" \times 6"$, and
 $5\frac{5}{8}" \times \frac{3}{8}"$,, ,, ,, ,, $5\frac{3}{4}" \times \frac{1}{2}"$

With regard to the pricing of timber, 10 per cent to 15 per cent should be added to the actual cost of same delivered at the yard to cover sawing, waste, and other incidental expenses.

A distinction should be made in the pricing of timber above and under 2" thick. The latter involves more cutting, waste, and handling than the former, therefore should command a higher figure.

Job No.	Name.	Work.	Description.	Cube.	As 1" Super.	Rate.	£	s.	d.	£	s.	d.	
221	Dayworks. (Robin's)	3. 2" framed L. and B. doors :	Red deal										
		4. 7'0" × 4½' × 2' stiles											
		2. 6'0" × 4½' × 2' "											
		3. 3'1" × 4½' × 2' top rails			37'0"								
		6. 3'1" × 9' × 1½" M. and B. rails			17'4"								
		2. 4'2" × 5' × 1½" braces			11'1"								
		2. 3'3" × 5' × 1½" "											
		1. 3'0" × 5' × 1½" "											
		1. 3'6" × 5' × 1½" "											
		7. 5'7" × 4'¾" × 1' match boards			65'5"	8d.	2	3	8				
		12. 6'9" × 4'¾" × 1' "			45'0"	55/-	1	4	9				
		2. 6'9" × 5' × 1' outside			5'8"	8d.	3	9	2				
222	Albion Hotel	12 Centres :	Spruce .										
		4. 2'0" × 6' × ¾"											
		16. 6'0" × 10" × ¾"			69'0"	7d.	2	0	3				
	Cinema .	Sundry :	Red .										
		3. 8'0" × 3" × 2"		1' 0"									
		1. 18'0" × 3" × 2¾"		11"									
		4. 20'0" × 2" × 1" battens=80 ft. lin.	"	11"		7/-	13	5					
		5. 21'0" × 3" × 1" moulding=105 ft. lin.				8/6	6	10					
		6. 16'0" × 2½" × ¾" moulding=96 ft. lin.				12/6	13	1					
		Summary :				9/6	9	2					
		Daywork											
							£7	14	11				

The price of mouldings can easily be obtained from the price lists of local timber merchants who usually handle those goods. On to these prices a percentage should be added as mentioned above for waste, etc.

Some people in the trade use mistaken methods in arriving at the cost of timber after conversion. To illustrate this we will give an ordinary but practical example.

Endeavour to find the actual prime cost per ft. cube of a parcel of oak boards purchased at 12s. ft. cube, on which there has been a waste of 25 per cent in conversion owing to sap, waney edges, etc.

In common practice it is often arrived at thus :—

$$12s. \times 25\% = 15s. \text{ ft. cube,}$$

which, however, is not correct, the actual cost being 16s. ft. cube, arrived at thus :—

$$\begin{array}{r} \text{1' 0" cube} \\ \text{Less 25\% waste .. } \underline{0' 3"} \\ \text{0' 9" costs 12s.} \end{array}$$

As 9" cube cost 12s., 12" cube costs 16s.

$$\begin{array}{r} 12" \times 12s. \quad 144 \\ \hline 9" \quad 9 \end{array} = 16s.$$

Of course we have not taken into account in the above the actual cost of machine work in conversion.

CHAPTER LVII

HAULAGE OR TRANSPORT BOOK

THIS book is used for the purpose of recording haulage performed (see specimen on page 255). Haulage can be classified under three headings, viz. :

- (a) Contractor's own carts at contracts.
- (b) " " " " headquarters or sundry work.
- (c) Hired carts.

It is not essential to enter details of the haulage performed by carts at contract unless the information is required for a specific purpose, but where miscellaneous haulage is being executed such as is usually done by carts working at headquarters, every load should be faithfully recorded, whether belonging to the Contractor or hired vehicles. The responsibility for the upkeep of this book should be vested in some member of the office staff whose duty it is to direct and control hauliers. It is only by keeping these records that a reliable cost can be kept.

It will only be necessary to price out the work of the Contractor's carts in the haulage book, as the charge for the hired carts will naturally be dealt with in the invoice book. (See Invoice No. 10 on page 247.)

The work of the Contractor's carts should be priced out at the same figure as that paid to hired vehicles.

When a Contractor's cart is sent to an out-of-town contract, it is sometimes found more accurate from a cost point of view (as well as being more convenient) to debit the haulier's wages, horse provender, and other incidental expenses direct to the job, plus a percentage to cover wear and tear of vehicles, hire of horses, etc., instead of making a charge of so much per day, as in the case of haulage done at headquarters.

The haulage account is debited with the running cost and upkeep of hauling, which includes wages, provender, wheelwrights' repair work, saddlery, shoeing and other smithwork, stable rent, insurance, water, light, etc., and is credited with

Date.	Haulier.	Ld.	Materials.	From.	To	Account.	Amount.
June 1	Barrow	1	Cement .	G.W.R. 69453 .	Albion Hotel .	Albion Hotel .	£ s. d. 0 8 3
		1	"	" " " 7982	Yard .	General stores .	0 8 3
		1	Ballast .	L. & N.W.R. 7982	Albion Hotel .	Albion Hotel .	0 8 3
		1	Ashes .	Gasworks .	Yard .	Mortar account	0 5 3
	Priestly	2	Mortar .	Yard .	Albion Hotel .	Albion Hotel .	0 15 0
		2	Ashes .	Brewery .	Yard .	Mortar account	0 9 9
		1	Lime .	G.W.R. 54530 .	"	"	0 5 3
	Thomas	2	Stone .	L. & N.W.R. 12396	Albion Hotel .	Albion Hotel .	} Hired cart
		2	Scaffolding	Yard .	Cinema .	Cinema .	
		1	Slates .	G.W.R. 73921 .	"	"	} Hired cart
		1	Bricks .	L. & N.W.R. 5690	"	"	
" 2	Barrow	5	Scaffolding	Yard .	Technical School	Technical School	1 10 0
	Priestly	2	Sand .	G.W.R. 45852 .	Albion Hotel .	Albion Hotel .	0 7 6
		1	Timber .	Ward & Co. .	Yard .	Timber .	0 15 0
	Thomas	1	Lead, etc. .	Albion Hotel .	"	Albion Hotel .	0 7 6
		1	Joists .	Yard .	Cinema .	Cinema .	} Hired cart
		1	1300 red P. Bks.	Hospital .	Albion Hotel .	Albion Hotel .	
" 3	Barrow	1	Ashes .	Brewery .	Yard .	Mortar account	1 2 6
		1	1500 W.G. Bks.	St. Mark's Church	Post Office .	Post Office .	0 7 6
	Priestly	6	Crushed stone	Cinema .	Albion Hotel .	Albion Hotel .	1 10 0
" 4	Barrow	6	"	"	"	"	1 10 0
	Priestly	6	"	"	"	"	1 10 0
Summary:							
			Technical School		£ s. d.		£12 0 0
			Albion Hotel .		0 7 6		
			General Stores .		6 9 0		
			Mortar, etc. .		0 8 3		
			Cinema .		1 7 9		
			Timber Account		1 10 0		
			Post Office, Hampstead		0 7 6		
					1 10 0		
					£12 0 0		
						Folio 33 Cost Book	

the amount debited the various contracts, etc., for haulage performed.

The foregoing system can be applied equally to motor or other transport.

In regard to motor work the following are amongst the items of cost that have to be dealt with :—

Driver	Garage rent	Establishment charges
Mate	Repairs	Depreciation
Boy	Oil	Wheelwright
Tyres	Grease	Van-body washing
Petrol	Insurance	Lighting, etc.

It has been recently claimed that after allowing for depreciation, tyre renewals, and other running expenses, that the present costs of an average motor lorry amounts to approximately 1s. 9d. per mile on a 4-ton load.

It is well to point out to the reader that the haulage account is quite a distinct and separate one from horses and carts account, and should not, therefore, be confused with it.

When a cart horse or trolley is purchased for haulage purposes the cost should be debited to the horses and carts account (see Invoice No. 12), and in the event of a sale of either the amount received therefrom credited to that account. A certain amount should be written off this account annually for depreciation.

A chapter dealing with the problem of general transport will be found on page 151.

CHAPTER LVIII

PETTY CASH

THIS book has already been explained on page 213. Our only concern now is how it affects the prime cost account.

The monthly entries, sales, and purchases are analysed, and entered into the prime cost book as shown on pages 216 and 219. This periodical analysis enables a Contractor to readily ascertain whether any abnormal expenditure is being incurred, and also detect any waste or irregularities that may be going on under this heading.

CHAPTER LIX

CASH BOOK

WE have already touched on this book on page 214. For the present we are only concerned with the items in the third column, referring to the cost ledger, viz. petty cash sales, and purchases as mentioned in the last chapter and various donations, subscriptions, etc.

It will be observed on reference to page 224 that these items are analysed and entered into the Monthly Cost Book.

CHAPTER LX

TRANSFER BOOK

THE purpose of this book is to provide facilities for recording the :—

- (a) Transfer of goods from one contract to another.
- (b) " " " contracts to headquarters.
- (c) " " " from one of the firm's yard to another.

In the course of business operations many transactions of this kind occur. There is scarcely a contract where, at completion, material of some value is not left over which has either to be diverted to another contract or returned to headquarters. It is, of course, not expected that trifling items should be considered when making up these records. Experience and discretion is, therefore, needed in dealing with them. Only goods of general utility should be considered. For instance, a small quantity of special pattern tiles may be left over, the value of which is problematical. One can hardly be justified in crediting them, but if the tiles were a plain white glaze or red quarry which would in all probability be used up somewhere or other, a credit could without hesitation be given for them when transferred. Goods should not be priced out at their invoice value unless special circumstances warrant it. A much lower figure is usually taken. It is unaccountable, but yet a fact, that notwithstanding the importance of a transfer account, many firms are absolutely ignorant of its existence, and therefore have no provision for same in their system of book-keeping. By this omission it naturally follows that some contracts receive credit (at the expense of others) for a more favourable position than is their due, and thereby creating a false statement of accounts.

The information necessary to complete these returns is extracted from the

- (a) Foreman's weekly material sheet.
- (b) The haulage book.

- (c) Yard and other delivery books.
- (d) Workmen's time-sheets.

The example on page 260 demonstrates the arrangement, as well as shows the need for this book.

Should a workman be sent out on a contract to execute some special work, it is expected of him to note at the back of his time-sheet all materials used by him on this work. When dealing with this record later the question will naturally arise as to where the material was obtained, and the answer will provide an item for our transfer book.

CHAPTER LXI

JOINERY COST BOOK

THIS is a supplementary cost book (see example, page 263), the purpose of which is to keep an exact cost of joinery work manufactured in the shop as a guide for future tendering. Its chief essentials are accuracy and clear, well-defined particulars of the work done. A small, detailed and figured sketch should be given where necessary. For reliable estimating of joinery work this book is almost indispensable. An example is given to illustrate its general purpose.

It will be noted that the actual cost is shown, so that trade expenses and profit must be added to the amount when considering same in regard to estimating. As the reader will have already learned, each job or rod has a distinctive number given it, and this is noted as shown in example. It is necessary for general reference that a register or index be kept of the various items recorded in the joiners' shop somewhat on the following lines :—

Date.	Job or Rod No.	Particulars.	For.
June 22	221	3 ledge doors, 2" thick .	Dayworks
„ 23	222	4 sashes & frames, 1 $\frac{3}{4}$ " thick	„
„ 23	223	3 sets stairs . . .	Waygood
„ 24	224	1 sliding partition . . .	School
„ 25	225	1 greenhouse	Dickens

Mention was made on page 210 that there were some subsidiary books necessary for the proper complement of a Contractor's office.

We will now give examples of them, with short explanations where considered necessary.

JOINERS' COST BOOK

Job
or
Rod } No. 221 Dayworks (Robin's).

2. 2" Framed ledged and braced doors, 7' 0" × 3' 0"
1. 2" " " " 5' 10½" × 3' 0"
= 59' 6" super.

(Space for rough figured sketch.)

WEEK ENDING

Trade.	22nd June.	29th June.	6th July.						Total.	Rate	Amount.
Foreman joiner .	½	1	—	—	—	—	—	—	1½	say,	£ s. d.
Machinist Borough	1½	3	—	—	—	—	—	—	4½	3/-	0 4 6
Machine time .	1½	2½	—	—	—	—	—	—	4	2/7	0 11 8
Joiner . .	—	5	8	—	—	—	—	—	13	2/6	0 10 0
										2/6	1 12 6

Timber (*see* T.B., folio 89) . . 2 18 8
3 12 2

Add 7½% Trade Exs. . . 6 10 10
0 9 10

Cost of "Labour" per foot super, 1/0¾d.
" " " " " " 1/3¾d.

7 0 8

CHAPTER LXII

CONTRACT ACCOUNT BOOK

THIS should be specially ruled and printed (see example, page 265). Immediately a contract is fixed up, particulars of same should be noted up in this book. An ample number of folios should be allotted to allow for noting up all extras, omissions, deviations, or other items of interest.

As will be seen from our example, the account starts with the contract amount, then (in chronological order) are entered all deviations from the original contract, no matter how large or small, or in what form they appear, whether confirmed by Architect or otherwise. It is practically speaking the Contractor's diary of events affecting the contract. It records all transactions having any financial bearing on the work. Therefore it is of paramount importance that it should be kept by some capable and responsible person. Further, it should be kept well up to date, as experience teaches that it is very easy to overlook charging up items of work when immediate notes are not made of them. All available data should be given when memorandums are made as a ready reference should their authenticity be questioned when settling accounts with Architect.

Most architects insert a clause in their contract that no extra work be performed without a written order, but this is more often honoured in the breach than in the observance. The Contractor should, however, confirm by letter any verbal order given him.

The foreman's weekly "extra" sheets should be minutely scrutinised when received and all fresh items booked up.

It is obvious that when preparing statements (of work done) for architects, these notes will be found of great service, and if they have been rigorously recorded there will not exist a feeling that probably some items have not been charged up.

CONTRACT ACCOUNT BOOK

No. 675.

CONTRACT. Alexandra Hotel.

BUILDING OWNER. London & Dover Breweries, Ltd.

ARCHITECT. Sydney Johnson.

Date of Architect's written instructions to commence

operations November 15th.

Do quantities form part of contract? . . . Yes.

Time allowed for execution of work Six months.

Penalty £5 per week.

Retention or maintenance period	• • •	Six months.
---------------------------------	-------	-------------

Period allowed Building Owner to pay certificate . Fourteen days.

Amount of instalments £500.

Percentage paid on work done, etc.	90%.
------------------------------------	------

Limit of Retention sum	£500.
------------------------	-------

If half retention due at completion Yes.

Arbitrators } J. E. Sankey, Esq., Architect.
 } Woodward, Esq. ,,

CUBIC CONTENTS, 46,500.

PRICE PER FT. CUBE, 2/-.

		Date Arch.'s Letter.	Date Cont.'s Letter.	f	s.	d.	f	s.	d.
Nov 5	Amount of contract . . .	—	—	£	—	—	4650	0	0
Dec. 1	One extra stone sill . . .	29/11/-	—	—	—	—	—	—	—
" 20	48 ft. barge board omitted . . .	20/12/-	—	—	—	—	—	—	—
" 23	42 ft. lin. extra Blue Bk. channel	20/12/-	—	—	—	—	—	—	—
Jan. 13	Repairing bar floor as directed, estimate	—	9/1/-	—	—	—	4	7	6
" 27	New fireplaces to bar, estimate Electric supply and bell ser- vice, estimate	—	9/1/-	—	—	—	10	15	6
Feb. 4	Cementing pine end, estimate Variation on fittings as agreed	27/1/- 4/2/-	— —	— —	— —	— —	49	7	6
Mar. 5	2 coats water paint to front cementing	5/3/-	—	—	—	—	10	10	0
" 18	Price of swing-hinges advanced 20% on Architect's P.C. amount in Quantities. Add advance. } Allow for skylight omitted, as agreed	—	—	—	—	—	5	5	0
May	Washing down and whitening ceiling and colouring walls of smoke-room, hall, etc., as estimate	—	—	—	—	—	—	—	—
		1/5/-	24/4/-	—	—	—	7	10	0

CHAPTER LXIII

ORDER BOOK

ORDER books should be in duplicate, also specially printed and numbered (see example below). They should also, for preference, be made of paper with a distinctive tint, such as light green, buff, or pink.

It is not always convenient to mention on an order the name of the contract for which the goods are required. Nevertheless, the information should, without exception, be noted on the order counterfoil for the guidance of the invoice clerk.

ORDER BOOK

GOODS SUPPLIED WITHOUT A PRINTED ORDER WILL NOT BE
ALLOWED IN THE ACCOUNT.

No. 731.

From SURREY & KENT,
CORPORATION AVENUE,
BIRMINGHAM.

To Bostwick & Sons.

June 19th.

PLEASE DELIVER TO

Our Yard as early as possible
1 Ton Cement @ 77/6 per ton, as quoted.

Confirming telephone message to-day.

Signed for SURREY & KENT,
D. J. Wilkinson.

Account (General Stores).

Where goods are being ordered for "extra" work, the fact should be stated on the order counterfoil, so that it can be recorded on the invoice later on, such information is of value when the time arrives for making up final accounts.

When an order is given over the 'phone and confirmed later by post, care should be taken to mention the fact that it is a confirmation only (see example). This will prevent the order being duplicated.

The counterfoil of an order should be crossed through or cancelled in some manner when the invoice relating to same has been checked and passed for payment.

CHAPTER LXIV

DELIVERY BOOK

To ensure everything being charged to its proper account, a delivery note should be made out for all material, finished fittings, or plant sent out from headquarters. We give below a copy of a delivery note, which it will be seen comprises plant, articles from general stores, and finished joinery from the shop.

The first nine items should be noted into the plant book

DELIVERY BOOK

SURREY & KENT, Birmingham		No. 690.
<i>Materials for</i> Technical Schools.		<i>Date,</i> January 3rd.
<div> <div> 2 12' batten ladders. 1 21 rung spar ,, 2 10' rods. 1 Straight edge. 1 Building square. 2 Picks. 2 Shovels. 1 Barrow. 2 Carpenters' stools. 1 Bag 3½" nails. 40 12" × 14" slates (second-hand). 4 Lead soakers. 28 lbs. copper slate nails. 4 Solid window frames 2 Bay windows 3 Framed L. & B. doors </div> <div> } Shop. </div> </div>		
TAKEN BY OWN Cart.		RECEIVED BY J. Mainwaring.

(see page 270), and the next four items into the general stores book (see page 250). Before cancelling the last three items it must be ascertained that the timber for the joinery has passed through the timber book. All items should be marked through or cancelled when dealt with.

CHAPTER LXV

PLANT BOOK

THE object of this book (see example) is to keep a record of the whereabouts of the firm's plant. The necessity for such information must be evident to all practical persons engaged in the trade. The book requires close attention in order to prove a satisfactory record. Time is, however, well spent on same, especially when several contracts are in progress, or when there are subcontractors at work.

PLANT BOOK

Technical Schools

Date.	Delivery No.	Plant.	From.	Date Removed.	To.
Dec. 1	342	3 doz. scaffold ropes.	Yard	Jany.	Albion Hotel
	—	1 " " poles	"	"	"
	—	1 " " planks	"	"	"
	—	$\frac{1}{2}$ " putlogs . .	"	"	"
	—	20 scaffold poles			
Jany. 3	690	2 12 ft. batten ladders . .	"		
	—	1 21 ring spars .	"		
	—	2 10 ft. rods . .	"		
	—	1 straight edge .	"		
	—	1 building square .	"		
	—	2 picks . . .	"		
	—	2 shovels . . .	"		
	—	1 barrow . . .	"		
	—	2 carpenters' stools .	"		

Chain blocks, pulleys, cramps, and other useful articles are often missed in the most mysterious manner, but when it is known and realised by those concerned that things are under close observation losses are often kept down to a minimum.

The sources from which information is derived are the delivery book, haulage book, and the foreman's weekly material sheets.

As explained in the preceding chapter, plant leaving the yard should be entered in the delivery book. It should eventually appear on the foremen's weekly material sheets of the contracts concerned. Should any plant be sent from one contract to another it should be noted on the material sheets of both jobs.

At the close of a contract, after all surplus Plant has been removed and entered up into the plant book, the account should practically balance itself in respect of most items. Should, however, any particular item of plant remain unaccounted for, enquiries should be made to clear the matter up satisfactorily. A certain sum should be debited every contract at the close for use of plant. This may be done on a percentage basis, on the cost of the contract, or on the actual loss sustained by depreciation through wear and tear whilst engaged on the job.

When new plant has to be purchased for any contract, a proportion of the cost of same should be debited to the contract, as suggested in our example on page 244, Invoice No. 1.

CHAPTER LXVI

EMPTYES BOOK

A RECORD of all empties should be entered in this book in the order in which they appear in the invoice book. The same rule obtains in regard to credit notes received for empties returned.

On examination of example on page 273 it will be observed that a line is reserved for each empty, irrespective of the fact that there may be more than one of the same description, and value charged on the same invoice, as it does not necessarily follow that they may be returned simultaneously. By this method ample room is allowed for recording all credits as they come to hand.

This book should be entered up at very short intervals so that any empties eligible for return can readily be detected. It should be part of the duty of an invoice clerk to see that no empties are kept about longer than is absolutely necessary. On page 194 will be found an article dealing with the subject of empties and how they should be handled.

EMPTIES BOOK

Date.	Invoice No.	Name.	No.	Size.	Description and Marks.	Price.	Contract, etc.	Date Returned.	Advice No.	Credit No.	Remarks.
June 20	2	Goldsworthy & Co.	1		H'ware case, No. 610	10/-	Tech. School	June 29	24	14	
			1		" No. 611	10/-	"	"	"	"	
			1		Cask No. 618	12/-	"	"	"	"	
June 1	6	Smith & Son	1	$\frac{1}{2}$ gal.	Petrol tin	2/-	Motor	June 30	26	15	
			1	"	"	2/-	"	"	"	"	
			1	"	"	2/-	"	"	"	"	
			1	"	"	2/-	"	"	"	"	

CHAPTER LXVII

RETURNS ADVICE BOOK

WHEN empties or goods of any kind are being returned, an advice should be sent to the consignees giving full particulars of them as suggested in example below.

Advices should be in duplicate and numbered, and the duplicates should be crossed off when credit notes are received.

The number of the advice note should be noted on the credit note for future reference.

<i>From :</i> June 29th Surrey & Kent, Contractors, Birmingham.	<i>To :</i> No. 24 Messrs. Goldsworthy & Co., Factors.
<p>Dear Sirs,</p> <p>Please note we have to-day returned to your address the following supplies per G.W.R., Birmingham, carriage paid, and signed for by F. K. Stark.</p> <p>Your credit note on arrival will oblige.</p> <p>2 cases @ 10/- each. Invoiced, June 20.</p> <p>1 cask @ 12/-. " "</p> <p>Yours faithfully,</p> <p>Surrey & Kent.</p>	

CHAPTER LXVIII

COPYING AND ADDRESS BOOKS

BEFORE dealing with each individual copying book, it is well to warn the reader against the modern tendency of neglecting the older method of recording letters, accounts, etc., in favour of typewritten duplicates. These are very useful and serviceable up to a point, but liable to get out of order or entirely lost, whereas if a copy is made in a specific book there is scarcely any likelihood of such a contingency occurring.

General Letter Copying Book.—All letters, post cards, etc., should be copied into this book. They should afterwards be indexed. This is essential for the smooth and efficient execution of correspondence.

Account Copying Book.—Every account rendered by the firm should, without exception, be copied into this book. No account should leave the office without first being copied. If accounts are sent out without a record being taken of them, there is a risk of their not being charged. Even if a note has been made of the total of an account, the details are often needed for reference later on.

Specification Copying Book.—A Contractor has often to submit short specifications to architects, subcontractors, and others, and also abridged specifications, with his instructions, to foremen and others. It saves time and worry if a record is kept of them. This book could also, with advantage, be used for copying all Government and such-like returns that have to be made.

Statement Copying Book.—In this book are copied all statements sent to architects when applying for certificates, and also any other statements that it is advisable to keep in record.

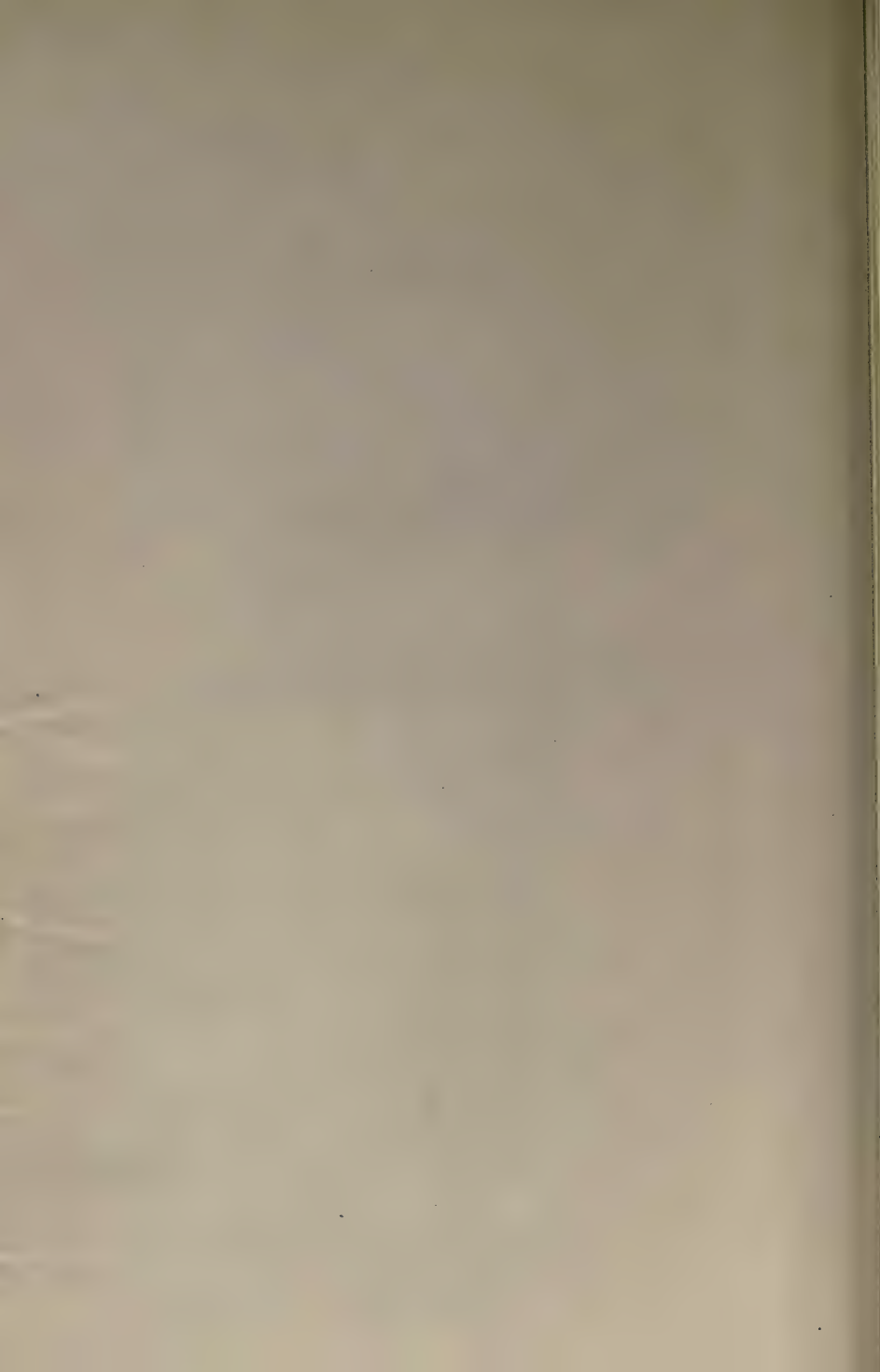
Estimates Copying Book.—It is advisable to have a separate book for copying all estimates, tenders, or approximate prices submitted by the firm. This book should be periodically examined by some responsible person, and all "accepted" estimates duly recorded in the "Contractor's Account Book" (see page 265).

A proper follow-up system should also be adopted in regard to general estimates, as it is very easy to overlook some of them where a large number are constantly being dealt with.

Address Book.—For the use of the general office staff, an address book should be kept, containing the names of all the customers and correspondents of the firm. It should be made out in proper alphabetical order, and all changes of address should be carefully noted. A separate list of the office staff, foremen, and leading workmen will also be found of great service in cases of emergency. In order to buy to the best advantage it is also advisable to keep a properly tabulated list of all available manufacturers, merchants, etc., as suggested in our article on Purchasing and Stock-keeping on page 127.

Stamp Book.—A book should be kept for recording all letters, etc., posted and cash spent on postage.

PART IV
TRADE MEMORANDA AND PLANT LISTS



CHAPTER LXIX

MEMORANDA FOR CONTRACTORS

THE following tables of " approximate " weights and quantities of material have been compiled with the object of serving primarily as a rough-and-ready means of reference when calculating quantities of material required before ordering same for contracts.

EXCAVATOR, CONCRETOR, AND DRAINER.

Material required for a cube yard, 6 to 1 cement concrete.

About 20 cwt. Stone ballast, about $2\frac{1}{4}$ " gauge.

"	4	"	"	"	fine	
"	6	"	Sand	"		
"	4	"	Cement	(2 bags of 10 to the ton).		

	About	
1 cube yard of Ballast, broken or crushed stone weighs 28 cwt.		
1 " " Sand	29	"
1 " " Marl and mud	25	"
1 " " Clay	29	"
1 " " Cement	19	"
1 " " Ashes and coke breeze	10	"

An average cartload of ballast or broken stone contains 30 cwt.

Twelve barrows of ballast or stone spalls equals 1 cube yard.

Number drain	4"	6"	9"	12"	15"	18"
pipes per ton	135	80	40	29	18	12

BRICKLAYER AND MASON.

One rod of reduced brickwork equals

272 ft. super of $1\frac{1}{2}$ brickwork.
 408 ft. " 1 "
 816 ft. " $\frac{1}{2}$ "
 306 ft. cube
 11 $\frac{1}{3}$ yds. cube, and weighs 15 tons.

Rule to reduce brickwork of any thickness to standard or reduced thickness is :

Multiply the superficial contents of the wall by the number of half bricks in thickness and divide by three. The product will be the standard thickness. This, divided by 272, gives the quantity of rods.

Walling stone weighs about 26 to 28 cwt. per cube yard.

Yorkshire stone ,, 14 $\frac{1}{2}$ ft. cube to the ton.

Derby & Portland

stone ,, 15 ,, ,, ,,

Bath-stone ,, 16 ,, ,, ,,

Marble and Granite ,, 13 $\frac{1}{2}$,, ,, ,,

It requires about 8 $\frac{1}{2}$ cwt. shoddies to make 1 yard super of shoddy stonework.

Mortar.

An ordinary Contractor's cart holds about $\frac{3}{4}$ cube yard mortar.

An ordinary mortar cart holds about 1 cube yard mortar.

It takes about 40 hods mortar to 1 cube yard.

An ordinary Contractor's barrow holds about 3 hods mortar.

Lime Whiting.

1 cwt. white lime will cover 100 yards super 1 coat.

1 $\frac{3}{4}$,, ,, ,, ,, 100 ,, 2 coats.

Dressed Stonework.

The usual custom of the trade in calculating the cubical contents of dressed stonework is to charge anything half an inch and over as the full inch.

CARPENTER AND JOINER.

Deals are purchased by the Petrograd standard. A standard contains

165 ft. cube, or
720 ft. lineal of 11 × 3.

The rule to bring deals to the standard measurement is to multiply the running number of feet in the parcel by the widths and thicknesses, and divide answer by 33, thus :—

990 ft. $6 \times 2 = 11880$
220 ft. $9 \times 3 = 5940$
216 ft. $11 \times 2\frac{1}{2} = 5940$

33)23760(720
231

66 *Answer:*
66 720 ft. of 11 × 3
— or 1 standard.
0

One square of boards equals 100 ft. super.

Weight of timber :—

34 cubic feet of Mahogany to the ton.

39	„	Oak	„
45	„	Ash	„
56	„	Beech	„
57	„	Elm	„
64	„	Fir	„
66	„	Deal	„

Proportion of Tread and Risers should be as follows :—

Width of Tread	8"	Height of Risers	7½"
„	9"	„	7"
„	10"	„	6½"
„	11"	„	6"
„	12"	„	5½"
„	13"	„	5"

Roofing Felt.

1 roll contains 200 ft. super.

Dry Rot and Fungus Cure.

Solution of sulphate of copper $1\frac{1}{2}$ lbs. to $2\frac{1}{2}$ gallons of water.

SLATER

Size.	Weight per 1200.	Number of slates per square.		
		3-in. lap.	$3\frac{1}{2}$ -in. lap.	4-in. lap.
24 by 14	65 cwt.	98	101	103
24 „ 12	55 „	115	118	120
22 „ 12	50 „	127	130	134
22 „ 11	45 „	138	142	146
20 „ 12	45 „	142	146	150
20 „ 10	35 „	170	175	180
18 „ 9	$27\frac{1}{2}$ „	214	221	229
16 „ 8	$22\frac{1}{2}$ „	277	288	300
14 „ 7	$17\frac{1}{2}$ „	375	392	412
12 „ 6	14 „	534	565	600
10 „ 8	15 „	515	554	600

Approximate number of zinc slating nails to the pound :—

2"	$1\frac{3}{4}$ "	$1\frac{1}{2}$ "
100	150	230

Approximate weight of copper slating nails per 1000 :—

2"	$1\frac{3}{4}$ "	$1\frac{1}{2}$ "
$11\frac{1}{2}$ lb.	10 lb.	$8\frac{1}{2}$ lb.

Average weight per foot super of slate slabs :—

$\frac{3}{4}$ "	1"	$1\frac{1}{4}$ "
11 lb.	15 lb.	19 lb.

Rule for finding the number of slates required to a square of slating (100 feet superficial).

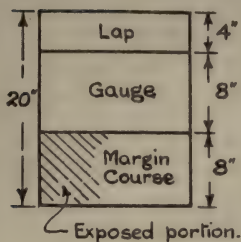
- Deduct lap from length of slate.
- Half the remainder to ascertain gauge.

- (c) Find number of superficial inches in gauge and width of slate.
 (d) Divide same into the number of superficial inches of a square (viz. 14,400).

Example.—Find the number of slates in a square of 20" × 12" slates, 4" lap.

$$\begin{array}{r}
 \text{Length} \quad 20'' \\
 \text{Less lap} \quad 4'' \\
 \hline
 16'' \quad \text{Half equals } 8'' \\
 8'' \text{ gauge} \times 12'' \text{ wide} = 96 \text{ superficial inches.} \\
 96 \overline{) 14400} (150 \\
 \underline{96} \\
 480 \\
 \underline{480} \\
 0
 \end{array}$$

Answer: 150 slates.



TILER

Number of tiles required to the square (100 ft. super) :—

4" weather	600	Plain tiles	10½" × 6½" × ½"
3½"	700	"	"
3	800	"	"
10	180	Pantiles	13½" × 9½" × ½"
11	164	"	"
12	150	"	"

500 ft. laths

125 nails

1 peck of tile pins

3 hods of mortar

500 ft. laths, and

125 nails

To square of plain tiles.

To square of pantiling.

Number of asbestos cement roofing tiles, etc., for diagonal fixing per sq. yard :—

Lap.	Size of Slates.	Distance of Laths from c/c	Laths necessary per sq. yd.	No. of Slates per sq. yd.	Weight of Slates only per sq. yd.
ins.	ins.	ins.	ft.		
2	$11\frac{3}{4} \times 11\frac{3}{4}$	$6\frac{7}{8}$	$15\frac{3}{4}$	$13\frac{5}{8}$	18 lbs.
$2\frac{1}{2}$	$11\frac{3}{4} \times 11\frac{3}{4}$	$6\frac{1}{2}$	$16\frac{5}{8}$	$15\frac{1}{8}$	20 lbs.
$2\frac{3}{4}$	$15\frac{3}{4} \times 15\frac{3}{4}$	$9\frac{1}{8}$	$11\frac{7}{8}$	$7\frac{5}{8}$	21 lbs.
3	$11\frac{3}{4} \times 11\frac{3}{4}$	$6\frac{1}{8}$	$17\frac{5}{8}$	17	$22\frac{1}{2}$ lbs.
3	$15\frac{3}{4} \times 15\frac{3}{4}$	9	12	8	22 lbs.
$3\frac{1}{2}$	$15\frac{3}{4} \times 15\frac{3}{4}$	$8\frac{5}{8}$	$12\frac{5}{8}$	$8\frac{5}{8}$	$23\frac{3}{4}$ lbs.
4	$15\frac{3}{4} \times 15\frac{3}{4}$	$8\frac{1}{4}$	$13\frac{1}{8}$	$9\frac{3}{8}$	$25\frac{3}{4}$ lbs.

Accessories for fixing the above :—

Copper rivets, 1 per tile.

Copper or galvanised nails, 2 per tile.

The standard pattern ($15\frac{3}{4}" \times 15\frac{3}{4}"$) tiles weigh approximately 25 cwt. per 1000.

IRONFOUNDER AND SMITH

Approximate weight of galvanised sheets :—

		18	20	22	24 W.G.
ft.	ins.	lbs.	lbs.	lbs.	lbs.
4	6	$23\frac{1}{2}$	18	15	$12\frac{1}{2}$
5	0	26	20	17	14
6	0	$31\frac{1}{4}$	24	$20\frac{1}{4}$	$16\frac{1}{2}$
6	6	$33\frac{3}{4}$	26	$21\frac{3}{4}$	$17\frac{3}{4}$
7	0	$36\frac{1}{2}$	28	$23\frac{1}{2}$	19
7	6	39	30	25	$20\frac{1}{2}$
8	0	$41\frac{3}{4}$	32	$26\frac{3}{4}$	22
9	0	47	36	30	25
10	0	52	40	34	28

Weight of wrought and cast iron, per foot super, approximately:—

Thickness in inches.	Wrought iron in lbs.	Cast iron in lbs.	Thickness in inches.	Wrought iron in lbs.	Cast iron in lbs.
1	40·30	37·50	$\frac{3}{8}$	15·10	14·10
$\frac{3}{4}$	30·25	28·10	$\frac{1}{4}$	10·10	9·40
$\frac{1}{2}$	20·15	18·75	$\frac{1}{8}$	5·04	4·10

To ascertain the weight of castings by weight of the patterns, multiply weight of deal pattern by:—

14 for Cast-iron

15 „ Brass

16·8 „ Copper

21 $\frac{1}{2}$ „ Lead

BRITISH STANDARD LISTS

OLD LIST		EXTRAS	NEW LIST		EXTRAS
lbs. per ft.			lbs. per ft.		
3" × 1 $\frac{1}{2}$ "	4	20/- per ton	3" × 1 $\frac{1}{2}$ "	4	20/- per ton
3" × 3"	8 $\frac{1}{2}$	"	4" × 1 $\frac{1}{2}$ "	5	"
4" × 1 $\frac{3}{4}$ "	5	"	4" × 3"	10	10/- per ton
4" × 3"	9 $\frac{1}{2}$	10/- per ton	4 $\frac{1}{2}$ " × 2"	7	"
4 $\frac{3}{4}$ " × 1 $\frac{3}{4}$ "	6 $\frac{1}{2}$	"	5" × 2 $\frac{1}{2}$ "	9	"
5" × 3"	11	Nil	5" × 4 $\frac{1}{2}$ "	20	Nil
5" × 4 $\frac{1}{2}$ "	18	Nil	6" × 3"	12	Nil
6" × 3"	12	Nil	6" × 5"	25	Nil
6" × 4 $\frac{1}{2}$ "	20	Nil	7" × 3 $\frac{1}{2}$ "	15	Nil
6" × 5"	25	Nil	8" × 4"	18	Nil
7" × 4"	16	Nil	8" × 6"	35	Nil
8" × 4"	18	Nil	9" × 4"	21	Nil
8" × 5"	28	Nil	9" × 7"	50	5/- per ton
8" × 6"	35	Nil	10" × 4 $\frac{1}{2}$ "	25	Nil
9" × 4"	21	Nil	10" × 6"	40	Nil
9" × 7"	58	5/- per ton	10" × 8"	55	10/- per ton
10" × 5"	30	Nil	12" × 5"	30	Nil
10" × 6"	42	Nil	12" × 8"	65	10/- per ton
10" × 8"	70	10/- per ton	13" × 5"	35	Nil
12" × 5"	32	Nil	14" × 5 $\frac{1}{2}$ "	40	Nil
12" × 6"	44	Nil	14" × 8"	70	10/- per ton
12" × 6"	54	Nil	15" × 6"	45	Nil
14" × 6"	46	Nil	16" × 6"	50	Nil

OLD LIST			EXTRAS	NEW LIST			EXTRAS
lbs. per ft.				lbs. per ft.			
14" × 6"	57		Nil	16" × 8"	75	10/-	per ton
15" × 5"	42		Nil	18" × 6"	55	"	
15" × 6"	59		Nil	18" × 8"	80	"	
16" × 6"	62		Nil	20" × 6½"	65	"	
18" × 7"	75	10/-	per ton	22" × 7"	75	15/-	per ton
20" × 7½"	89	"		24" × 7½"	90	20/-	per ton
24" × 7½"	100	20/-	per ton				

The Extras lists mentioned above are subject to alteration.

WEIGHT IN LBS. EACH OF BLACK BOLTS WITH NUTS
HEAD AND NUT HEXAGONAL

(Note.—Length is taken from underside of bolt head to end of bolt.)

Length. Ins.	Diameter of Bolt in Inches											
	¼	⅜	½	⅝	¾	7/8	1	1⅛	1¼	1⅜	1½	
1	·031	·090	·195	·345	·575							
1½	·033	·094	·202	·356	·591							
1¾	·305	·097	·209	·366	·606	·932						
1⅝	·037	·101	·216	·377	·622	·953						
1⅞	·038	·105	·223	·388	·637	·974	1·41					
1⅞	·040	·109	·229	·399	·653	·996	1·44					
1¾	·042	·112	·236	·410	·668	1·017	1·47	2·03	2·70			
1⅞	·044	·116	·243	·421	·684	1·038	1·50	2·07	2·74			
2	·045	·120	·250	·432	·700	1·060	1·52	2·10	2·78	3·62	4·65	
2¼	·05	·13	·26	·45	·73	1·10	1·58	2·17	2·87	3·73	4·78	
2½	·05	·13	·28	·47	·76	1·14	1·64	2·24	2·96	3·83	4·90	
2¾	·06	·14	·29	·50	·79	1·19	1·69	2·31	3·04	3·94	5·03	
3	·06	·15	·30	·52	·82	1·23	1·75	2·38	3·13	4·04	5·15	
3¼	·06	·16	·32	·54	·86	1·27	1·80	2·45	3·21	4·15	5·28	
3½	·07	·17	·33	·56	·89	1·32	1·86	2·52	3·30	4·25	5·40	
3¾	·07	·17	·35	·58	·92	1·36	1·91	2·59	3·39	4·36	5·53	
4	·07	·18	·36	·61	·95	1·40	1·97	2·66	3·48	4·46	5·65	
4¼	·08	·18	·37	·63	·98	1·44	2·02	2·73	3·56	4·57	5·78	
4½	·08	·19	·39	·65	1·01	1·48	2·08	2·80	3·65	4·67	5·90	
4¾	·08	·20	·40	·66	1·04	1·53	2·14	2·87	3·74	4·78	6·03	
5	·09	·21	·41	·69	1·07	1·57	2·19	2·94	3·82	4·88	6·15	
5¼	·09	·22	·43	·71	1·11	1·61	2·25	3·01	3·91	4·99	6·28	
5½	·09	·23	·44	·74	1·14	1·65	2·30	3·08	3·99	5·10	6·40	
5¾	·10	·23	·46	·76	1·17	1·70	2·36	3·15	4·08	5·20	6·53	
6	·10	·24	·47	·78	1·20	1·74	2·41	3·22	4·17	5·30	6·65	

Add for each additional inch and 12 inches

1	·014	·031	·055	·087	·125	·170	·222	·281	·347	·421	·50
12	·167	·376	·668	1·043	1·502	2·044	2·67	3·38	4·17	5·05	6·01

PLASTERER

One bundle 4 ft. "sawn" laths, $1'' \times \frac{1}{4}''$, and 500 nails covers 5 yards super.

One bundle 4 ft. "split" laths covers 8 yards super.

There are 100 laths in a 5' bundle of sawn laths.

"	125	"	4'	"	"
"	143	"	3' 6"	"	"
"	167	"	3'	"	"
"	200	"	2' 6"	"	"

A bundle of sawn laths always contains 500 ft. run of single lath.

Split laths (of all lengths) are usually sold 200 laths to the bundle.

Number of yards superficial that can be rendered with one bushel of cement mixed with sand in various quantities:—

Thickness.	$\frac{1}{2}''$	$\frac{3}{4}''$	$\frac{7}{8}''$	1"
	Yds.	Yds.	Yds.	Yds.
1 cwt. of neat Portland cement .	2·8	2·1	1·7	1·4
„ with 1 cwt. of sand .	4·6	3·6	2·8	2·3
„ „ 2 „ „ .	6·7	5·0	4·2	3·4
„ „ 3 „ „ .	9·0	6·7	5·6	4·5

1 ton fine sand and } will make 175 yards super skimming
1 „ white lime } stuff.

1 ton sirapite (or similar material) will cover 125 to 150 yds. super on laths.

1 ton sirapite (or similar material) will cover 200 to 250 yds. super on brick.

1 ton sirapite (or similar material) will cover 300 yds. finishing coat.

Weight of

Fibrous fireproof partition slabs	{	2" thick=30 yds. to the ton.			
		2½" " =24 " " "			
		3 " =20 " " "			
Breeze concrete	{	2" " =24 " " "			
		2½" " =20 " " "			
		3 " =16 " " "			

PLUMBER

Approximate amount of solder required for lead-pipe joint :—

$\frac{1}{2}"$	$\frac{3}{4}"$	1"	1¼"	1½"	2"
—	—	—	—	—	—
$\frac{3}{4}$ lb.	1 lb.	1¼ lb.	1½ lb.	1¾ lb.	2¾ lb.

Weights of compo gas-piping :—

$\frac{1}{4}"$	$\frac{3}{8}"$	$\frac{1}{2}"$	$\frac{3}{4}"$
—	—	—	—
$\frac{3}{4}$ lb.	1¼ lb.	2 lb.	3½ lb. per yard.

Rolls of sheet-lead are usually 7 ft. wide, 25 to 30 ft. long, and about $\frac{1}{2}$ ton weight.

Coils of lead pipe are usually 1¾ to 2 cwt. each.

One gallon water weighs about 10 lb.

Rule to obtain capacity of a rectangular cistern.—Multiply the length by the breadth in feet, and the product by the depth. The result, multiplied by $6\frac{1}{4}$, will give the capacity in gallons, there being about $6\frac{1}{4}$ gallons in 1 cube foot of water.

Rule to obtain capacity of a circular cistern.—Multiply the diameter into itself and deduct one-fifth from the product. Then multiply the remainder by the depth and the result by $6\frac{1}{4}$, as for square cistern.

		$\frac{1}{2}"$	$\frac{3}{4}"$	1"	1¼"	1½"	2"
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Approximate weight per yard of	" Light "						
	lead pipe	3½	6	7	9	12	20
	" Middle "						
	lead pipe	4½	7½	10	13	16½	25
"	" Stout "						
	lead pipe	7	9	12	15	19	30

LEAD SOIL PIPE

ALL IN 10 OR 12 FEET LENGTHS

Inside Diam.	Weight per Yard.	Equal to.
2 inch	10 lbs.	7 lb. sheet lead.
2 "	14 "	8 " "
2½ "	14 "	7 " "
	22 "	10 " "
	16 "	7 " "
3 "	21 "	8 " "
	24 "	9 " "
	17½ "	6 " "
3½ "	20 "	7 " "
	23 "	8 " "
	18 "	6 " "
	21 "	7 " "
4 "	24 "	8 " "
	27 "	9 " "
	30 "	10 " "
4½ "	26 "	8 " "
5 "	30 "	8 " "
6 "	36 "	8 " "

ZINC AND COPPER WORKER

Sheet zinc is generally manufactured in sheets 8 ft. × 3 ft., and approximate weights per foot super are as follows :—

Continental Gauge No.	10	11	12	13	14	15	16
	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Weight per foot super	11½	13¼	15⅛	17	18¾	21¾	24¾

WEIGHT OF COPPER

Per foot super
B.W.G.

20	22	24	26	28	30
lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
1 12	1 6	1 0	— 13	— 10	— 8

Per cubic foot=550 lbs.

WEIGHT OF METALS

Weight of 1 square foot

Thickness.	Wrought Iron.	Cast-iron.	Steel.	Copper.	Tin.	Zinc.	Brass	Gun Metal.	Lead.
$\frac{1}{16}$	lbs. 2·50	lbs. 2·34	lbs. 2·55	lbs. 2·89	lbs. 2·41	lbs. 2·28	lbs. 2·63	lbs. 2·73	lbs. 3·71
$\frac{1}{8}$	5·00	4·69	5·10	5·79	4·81	4·55	5·26	5·46	7·41
$\frac{3}{16}$	7·50	7·03	7·65	8·68	7·22	6·83	7·89	8·19	11·1
$\frac{1}{4}$	10·0	9·38	10·2	11·6	9·63	9·10	10·5	10·9	14·8
$\frac{5}{16}$	12·5	11·7	12·8	14·5	12·0	11·4	13·2	13·7	18·5
$\frac{3}{8}$	15·0	14·1	15·3	17·4	14·4	13·7	15·8	16·4	22·2
$\frac{7}{16}$	17·5	16·4	17·9	20·3	16·8	15·9	18·4	19·1	25·9
$\frac{1}{2}$	20·0	18·7	20·4	23·2	19·3	18·2	21·1	21·9	29·7

PAINTER.

Whitening.—12 lb. whiting, $\frac{1}{2}$ lb. blue, $1\frac{3}{4}$ lb. size, will cover 100 yds. super, one coat.

21 lb. whiting, $\frac{3}{4}$ lb. blue, $2\frac{3}{4}$ lb. size, will cover 100 yds. super, two coats.

1 lb. of ready-mixed paint will cover (after priming) : First coat, 4 super yards ; second coat, 5 ; third coat, 6 ; fourth coat, 7.

One gallon priming colour covers 50 super yards.

One gallon of ready-mixed paint will cover about : On wood, 60 super yards ; iron 46 ; compo, 44 ; stone, 28.

One pint varnish will cover 15 yards super.

One gallon stain will cover 95 yards super.

One gallon wood preservative will cover 200 yards super.

One gallon tar will cover 25 yards super.

1 lb. glue will make 1 gallon of size.

Turps substitute weighs 8 lb. per gallon.

Genuine turpentine „ 8½ lb. „

Linseed oil „ 9 lb. „

Varnish „ 9½ lb. „

Tar „ 11½ lb. „

A book of gold leaf contains 25 leaves, $3\frac{1}{4}'' \times 3\frac{1}{4}''$, and will cover about 1 sq. foot of plain work.

48 lb. white lead	} Will cover on an average about 100 yds. super of painting, 4 coats.
4 lb. putty (for stopping)	
1 lb. red lead	
1 lb. driers	
2 gallons linseed oil	
2½ pints turps	
½ lb. size	
1 pint knotting	

WASHABLE WATER PAINTS.

1 cwt. will cover approximately on non-porous surface	}	700/800 sq. yds. 1 coat work
		300/400 „ 2 „
		225/275 „ 3 „

GLAZIER.

1 cwt. of best linseed oil putty will glaze 300 to 350 ft. super.

English sheet-glass is made in four qualities—Best, Seconds, Thirds, and Fourths; and in four substances—15 oz., 21 oz., 26 oz., and 32 oz. :—

A crate of	15 oz.	contains about	420 feet
„	21 oz.	„ „	360 „
„	26 oz.	„ „	300 „
„	32 oz.	„ „	250 „

Coloured, enamelled, embossed, and figured glass is made in 16 oz., 21 oz., 26 oz., and 32 oz.

Rolled plate and rough plate is made $\frac{1}{8}''$, $\frac{3}{16}''$, $\frac{1}{4}''$, and $\frac{3}{8}''$ thick.

Rough cast is made $\frac{1}{4}''$, $\frac{3}{8}''$, $\frac{1}{2}''$, $\frac{3}{4}''$, and 1" thick.

Polished plate is made in three qualities, viz. : Ordinary, Best, and Silvering, and can be obtained $\frac{1}{8}''$ to 1" thick.

Cathedral glass is about 26 oz., and $\frac{1}{8}''$ thick.

Glass tiles rolled plate $\frac{1}{8}''$ to $\frac{1}{2}''$ thick, and sheet-glass.

The trade method of calculating the superficial contents of "clear," enamelled, and fluted glass is to count any fraction less than the half-inch as half-inch.

For example :— $15\frac{3}{8}" \times 17\frac{1}{4}"$ to count as $15\frac{1}{2}" \times 17\frac{1}{2}"$
 $19\frac{5}{8}" \times 23\frac{7}{8}"$ „ $20" \times 24"$

and in the case of all other glass (plate, muranese, artic, etc.), all fractional parts of an inch to be treated as a full inch, viz. : $15\frac{3}{8}" \times 17\frac{3}{4}"$ count as $16" \times 18"$.

Irregular shaped plates are charged the full size of the squares from which it is necessary to cut them, and for all difficult shapes a further charge is usually made for risk in cutting.

PAPERHANGER.

One piece of English paper is 12 yds. long by 21 in. wide = 7 yds. super.

One piece of French paper is 9 yds. long by 18 in. wide = $4\frac{1}{2}$ yds. super.

One piece of Lining paper is 12 yds. long by $22\frac{1}{2}$ in. wide = $7\frac{1}{2}$ yds. super.

Allow 1 in 10 for waste with small pattern paper, and 1 in. 7 for waste with large pattern paper.

CHAPTER LXX

PLANT LISTS

SHORT list of Contractor's Plant, etc., in the order of "Trades."

Foreman and Clerk of Works' offices.
Mess-Room and Stores, Sheds, etc.

EXCAVATOR :

Barrows
Carts
Duck lamps
Dumpy level
Fire-devils
Grubbers
Iron bars
Light railways
Picks
Points and crossings
Pile drivers
Pumps
Road-scrapers
Sledges and rammers
Shovels
Tip wagons
Wheelbarrows
Wheeling planks and sleepers
Sighting-rods
Strutting-boards

DRAINER :

Barrows
Boning-rods
Drain-rods
Picks
Shovels
Sight rails
Smoke test machine
Wheeling planks

CONCRETOR AND FERRO CONCRETOR :

Barrows
Boxes for heads, sills, etc.
Buckets
Centring and shuttering
Concrete mixers
Concrete block-making
machine
Chutes, conveyors and
elevators
Floating rules
Hoists and tackle
Hoist buckets
Hosepipe
Rammers
Saws
Screens
Shovels
Sieves
Stone and sledge-hammers
Spots
Stay-irons and bolts for cen-
tring, etc.
Stone breaker or crusher
Straight edges
Timbering
Water-tank

MASON AND BRICKLAYER :

Banker sheds
 Barrows
 Blocks (lifting) and fall, etc.
 Brick-cleaners
 Brooms
 Buckets
 Building squares
 Centres
 Cranes
 Derrick and towers
 Dogs and chains
 Engine oil and grease
 Fall ropes
 Gauge-rods
 Hand truck
 Hods
 Hoists and tackle
 Iron rollers
 Mortar mill and engine and
 belting equipment
 Ladders
 Lewis (single and double)
 Lockers
 Mason lines
 Measuring rods
 Plumb-rule
 Pulley-blocks
 Putlogs
 Scaffold bars
 „ planks
 „ poles
 „ wedges
 „ ropes or steel lashes
 Shear-legs
 Sledge hammers
 Sling-chains
 Spalling hammers
 Spots
 Straight edges
 Tarpaulins
 Turning pieces

CARPENTER :

Augers
 Axes
 Branding irons ; brooms
 Cramps
 Cross-cut saw
 Draw knives
 Fox-trimmer
 Floor dogs
 General joiner
 Glue-pot
 Grindstone
 Hand truck
 Handsaws
 Ladders
 Mortice machine
 „ chisel
 Nail-boxes
 Plumb rules
 Saws and sawing stools
 Saw sharpeners
 Spanner
 Tarpaulins
 Vice

SLATER, TILER, AND
PLASTERER :

Slater's rip
 „ punch
 „ hammer
 „ axes
 Buckets
 Cornice moulds
 Darby
 Feather edges
 Floating rules
 Hods
 Ladders
 Scaffolding and planks
 Screens
 Screeds

Slater's block
Spots
Straight edges
Trestles and planks
Water-tanks

SMITHWORKER :

Anvil and tools
Cutting and drilling machines
Portable forge and trough
Sledges and chisels
Spanners
Stocks and dies
Swage block
Vice

PLUMBER :

Blow-lamp
Ladle
Metal-pot
Gas-tongs
Pipe vice
Petrol
Pipe-cutters
Scrapers
Spanners
Stocks and dies

PAINTER AND GLAZIER :

Blow-lamp
Buckets
Diamond
Dusters
Dust-sheets
Ladders
Paddle brushes and tools
Paint brushes
Paint kettles
Painter's cradle
Spots

Steps
Trestles and planks
T-square

PAPERHANGER :

Buckets
Dust-sheets
Paddle and papering brushes
Pasteboards
Steps
Trestles
Scrapers, scissors, etc.

FLOOR CLEANER.

Buckets
Cloths
Scrub brushes
Soap
Soda
Sweeping brushes
Warm water

WINDOW CLEANER :

Buckets
Cloths
Ladders
Trestles

HAULIER :

Bedding for horses
Carts and trolleys
Chaff-cutters
Corn-bins
Curry-comb
Dandy brush
Horse collars
„ cloths
Locker
Nosebag

Short list of Contractor's Plant in alphabetical order :—

Anvil	Engine and shed
Axe	„ oil
Banker sheds	„ waste
Barrows	„ tallow and grease
Bars	Fall ropes
Bedding for horses	Firewood
Blocks	Fire-devils
Blow-lamps	Floating rules
Boning-rods	Floor-dogs
Boxes for concrete steps, etc.	Foreman's office
Branding-irons	Gantries
Brick-cleaners	Gas-tongs
Brushes (various)	Gauge-boxes
Buckets	„ rods
Building squares	General joiner
Carts and trolleys	Gin wheels
Centres	Grindstone
Chaff-cutter	Grubbers
Clerk of Works office	Hammers
Concrete mixers, chutes, elevators and conveyors	Hand-saw
Concrete block-making machines	Hand-truck
Corn-bins	Hoarding
Cramps	Hods
Cranes	Hoists and tackle
Cross-cut saw	Hose pipe
Curry-combs	Horse collars
Dandy brushes	„ cloths
Derrick crane	Hydraulic jacks
Derrick tower	Iron bars
Dogs and chain	„ dogs
Drain rods	„ rollers
Draw knives	„ water-tanks
Drilling machines	Jib crane
Duck lamps	Ladders
Dusters	Ladle
Dust-sheets	Lewis (single and double)
Dumpy level	Lockers

Mason lines	Self-lifting hoist buckets
Metal-pot	Shear legs
Mess-room	Shovels
Measuring-rods	Shoring planks
Mortar mill	Sieves
Mortice machine	Sight rails
„ chisel	Slate punch and hammer
Motor lorry	„ rip and axes
Nail-box	Slater's block
Nosebags	Sledges
Paddle brushes	Sleepers
Paint „	Sling chains
„ kettles	Smoke test machines
Painter's cradle	Snatch-blocks
Paper brushes	Soldering-irons
Pasteboards	Spalling hammers
Picks	Spanners
Pipe and vice	Spare belting and fasteners
Plumb-rules	Spots
Portable-forge	Stay irons and bolts for concrete centring
Pulley-blocks	Steps
Pumps	Stocks and dies
Putlogs	Stone-crusher
Rails (points and crossings)	Stores shed
Rammers	Straight edges
Road-scraper	Strutting boards
Rods (measuring)	Sweeping-brushes
Rollers (iron)	Tarpaulins
Runner planks	Timber for centring
Saws	Tip wagons
Saw sharpeners	Trestles and planks
„ stools	Trolleys and carts
Scaffold bars	Tubs (for scaffold pole bases)
„ planks	Turning pieces
„ poles and wedges	Vices
„ ropes and sashes	Wedges
Screeds	Wheelbarrows
Screens	Wheeling planks
Screw jack	Winch and tackle
Scrub brushes	

INDEX

ACCOUNTS, 163
 — book, 211
 — collection, 107
 — copying book, 211
 — final, 97, 163
 — general, 164
 — payment of, 164
 — settlement of, 96
 — tradesmen's, 164
 Address book, 276
 Administration, 17, 103
 Advance in wages, 26
 Advertising, 16, 40
 Advising surveyor, 35
 American oak, 130
 — redwood, 64
 — whitewood, 65, 130
 Analysis of invoices, 242
 Ancient lights, 22
 Anticipated profits, 163
 Appeals (assessment), 179
 Apprentices, 105
 Arbitrators, 20
 Archangel deals, 64
 Architect, 18, 24
 — certificates, 96, 157
 — details, 25
 Asbestos tiling, 73, 284
 Ash, 281
 Ashes, 10, 279
 Asphalte, 52, 135
 Assessment appeals, 179
 Austrian oak, 64
 Authority to start, 24
 Average clause, 170

BAD debts, 82
 Balkstone, 280
 Ballast, 64, 279
 Bank charges, 119
 — overdraft, 119
 — turnover, 120
 Banking, 119
 Beech, 281
 Belting, 156
 Bent plate glass, 92
 Bills of quantities, 18
 Blackboard (slate), 135

Blinds, 57, 135
 Blistering (plaster), 82
 Boards, wrot, 56
 Boiler insurance, 176
 Bolts and nuts, 286
 Book-keeping, 209
 Brass, weight of, 290
 Breach of contract, 95
 Breakages and shortages, 197
 Bricklayer, 47
 — memoranda, 279
 — plant list, 294
 Brickwork, 48
 — cleaning down, 49
 Bricks, 37, 135
 — special, 48
 Broken stones, 279
 Broseley tiling, 73, 135
 Brushes, care of, 89, 117
 Builders' merchants, 128, 202
 Buildings insurance, 170
 Building owners, 19
 — materials, 203
 Burglary insurance, 177
 Business methods, 4

CANALS, 36
 Canary wood, 65, 130
 Capital, 3, 182
 Carpenter, 54, 281
 — memoranda, 281
 — plant, 294
 Carriage on empties, 195
 Carts hired, 152
 Cartway, 9
 Carving, 53, 136
 Casements (steel), 80, 136
 Cash book, 212, 214
 — discounts, 133, 164
 Catalogues, 202
 Cement, 44, 279
 — concrete, 279
 Ceremonies, 53, 149
 Certificates, 96, 157
 — payment, 96, 157
 Cessation of work, 26
 Channelling, 52, 136
 Chases, 25

Checking bank charges, 121
 — quantities, 18
 Claims for breakages, 197
 — insurance, 174
 Classification book, 186
 Clay, 279
 Clean windows, 95
 — down brickwork, 49
 — — stonework, 53
 Clerk of works, 30
 Clients, delinquent, 164
 Cloak room fittings, 136
 Coal, 38
 Collection of accounts, 107
 Columbian pine, 130
 Columns (C.I.), 80, 136
 Commissions, 4
 Common bricks, 37, 48
 Compensation claims, 175
 Completion of contract, 95
 Compo pipe weight, 288
 Concrete gauging, 44
 Concretor, 40, 44
 — memoranda, 279
 — plant, 293
 Conditions of joinery sales, 62
 Consignment of traffic, 192
 Constructional ironwork, 76
 Contingencies, 163
 Contract administration, 17
 — completion, 95
 — damages, 99
 — form, 20
 — guarantees, 176
 Contractors' accounts, etc., 163, 265
 Conveyancers, 61
 Coping, 51, 136
 Copper cylinders, 136
 — memoranda, 289
 — weight of, 290
 — worker, 289
 Copying books, 275
 Cornices, 81
 Correspondence, 108
 Country stations, 10
 Cranes, 10
 Credit notes for returns, 196, 274
 Crests (ridge), 73, 136
 Crushed stone, 279
 Crusher, 9
 Cylinders, 136

DAMAGED goods claims, 198
 Damages on contracts, 98
 Dampcourse, 48
 Daywork accounts, 166
 — folder, 112
 Deadcut joists, 76

Dead stock, 117
 Deals, 281
 Decorative material, 204
 Delays, 25
 Delinquent clients, 164
 Delivery book, 210, 268
 Demolition of buildings, 11, 33, 40, 150
 Demurrage, 192
 Deposit cheque, 13
 Depreciation of plant, 183, 201
 Derby stone, 280
 Desk folder, 112
 Despatch, 17
 Details (architect's), 58
 Deviations, 160, 264
 Diary, 113, 164
 Digest of letters and orders, 108
 Discounts, 21, 128, 134, 164, 212, 239
 Douglas fir, 65
 Drainer, 46
 — memoranda, 279
 — plant, 293
 Drains (testing), 46
 Dressed stone, 50, 136, 280
 Driers, 291
 Driving accident insurance, 176
 Dropping scaffolding, 53
 Dry rot cure, 281

ELECTRIC fittings, 84
 — lighting, 84
 — power, 154
 — service, 84, 137
 — wiring, 81
 Elm, 281
 Empties, 194
 — book, 210, 272-4
 Eng teak, 64, 130
 Engines, 11, 154
 — insurance and tests, 35, 176
 Enrichments, 81
 Establishment charges, 3, 16, 182, 221
 Estimate book, 210
 Estimated profits, 183
 Estimating, 8
 Excavator, 9, 42
 — memoranda, 279
 — plant, 293
 Extra sheets, 30, 32

FACING bricks, 48
 Factory Act, 39
 Failings of subcontractors, 37, 147
 Fanlight openers, 70
 Felt, 281

Ferro concrete plant, 293
 Fidelity guarantee, 176
 Filing correspondence, III
 — invoices, 210
 Final account, 97, 163
 — certificates, 162
 Fir, 281
 Fire insurance, 169
 Fireproof construction, 204
 Fireproof floors, 45, 137
 — partitions, 82, 137, 288
 Fixing tiles, 74
 Floor-cleaning plant, 295
 — protection, 56
 — Reinforced concrete, 45
 — tiling, 74
 — washing, 95, 295
 Folders (correspondence), III
 Folding partitions, 57, 137
 Foremen, selection of, 27
 — duties and qualifications, 27
 — tally book, 210, 251
 Foundation stones, 53, 137
 French polishing, 59, 142
 — wallpaper, 292
 Fumigation of oak, 60

GALVANISED sheets, 80, 284
 Roof vents, 55, 143
 — tubing, 55, 138
 — wire guards, 57, 138
 Gas fitter, 83
 — meter removals, 97
 — pipes, 81
 — service, 138
 Gates and railings, 79, 142
 Gauging concrete, 44
 Gefle timber, 64
 General accounts book, 211
 — administration, 17
 — ledger, 213
 — stock, 127
 — stores book, 249
 Gilding and lettering, 89, 140
 Girders, 76
 Glass, 91, 138, 291
 — measurements, 292
 — stock, 91
 Glazed bricks, 48
 — tiles, 74, 138
 Glazier, 91, 139
 — memoranda, 291
 — plant, 295
 — subletting, 91
 Glue, 290
 Gold leaf, 89, 291
 Gothenburg red, 63
 Grates, fixing, 53

Graining, 89
 Granite, 280
 Granolithic floors, 45, 52, 139
 Ground rents, 181
 Guarantee bonds, 176
 Guilds, building, xvii
 Gulf Ports timber, 64
 Gulleys, 139
 Gun metal, weight of, 290
 Gutters (rain water), 77

HARDWOODS, 64, 144
 Haulage, 10, 39, 139, 151
 — book, 210, 254
 — plant, 295
 Heating and lighting, 25, 83, 139, 205
 Hired carts, 153
 Hoarding, 40
 Hopper cheeks, 70
 Horses and carts, 152
 — rations, 153
 Hot-water service, 84

INCOME Tax returns, etc., 179
 Insurance, 36, 150, 167
 — brokers, 168
 — claims, 174
 — plate glass, 92
 — proposals, 169
 — rebates, 171
 Introduction, xiii
 Invoices, 105, 164, 238
 — book, 210
 Iron castings, 76
 — construction, 76, 140
 — joists, 76, 285
 — sashes, 140
 — stove tubing, 140
 — steelwork, 38
 — weight of, 285, 290
 Ironmongery, 66, 131, 204
 — fixing, 66
 Ironfounder and smith, 76
 — memoranda, 284

JAPANESE oak, 64
 Jarva teak, 64
 Joiner, 58
 — memoranda, 281
 — shop machinery, 155
 Joinery, 55, 59, 204
 — conditions of sale, 62
 — cost book, 210, 262
 — lists, 60
 — priming, 56
 Joists, steel, 285
 Journal, 212

KEMI red, 63
 Keys, 97
 Knotting, 291

LABOUR, 7, 14
 Landscape gardening, 95
 Latches, 67
 Lathing, 82, 140
 Laths, 82, 287
 Leadlights, 51, 92, 140
 — templates, 51, 93
 Lead pipe, weights of, 289
 Leadwork, 72, 140
 — checking quantities, 83
 Ledger, general, 213
 — private, 222
 Letters, 105, 111
 — copying book, 210, 275
 — digest book, 108, 134
 Lighting and heating, 25, 84, 205
 Lightning conductors, 140
 Lime, 140
 Lime whiting, 280
 Lining paper, 292
 Linseed oil, 291
 Lloyd's insurance, 170
 Local rates, 179
 — surveyor, 35
 Locks, 66
 Loss of profits insurance, 177

MACHINERY and plant, 154,
 206, 236
 Machinery charges, 236
 — depreciation, 183
 Mahogany, 130, 281
 Manhole covers, 140
 Marble, 280
 Marking joinery, 55
 Marl, 279
 Mason, 50
 — memoranda, 279
 — plant, 294
 Material sheets, 31
 Memorial stones, 53, 137
 Metals, weight of, 290
 Methods of rendering accounts, 160
 — ordering goods, 133
 — stocktaking, 200
 Moulded bricks, 48
 Mouldings, 130, 141
 Moulmein teak, 64
 Mortar, 10, 280, 141
 — mills, 10
 — purchase, 47
 Mortgage interest, 181
 Mosaic, 52, 141
 Motor, 117

Motor, insurance, 177
 — transport, 256
 Mud, 279

NAILS, 131, 141, 282
 National insurance, 231
 Notice for drain test, 46
 Northern white oak, 64
 Norwegian timber, 64

OAK, 60, 281
 — fumigation, 60
 Office administration, 103
 — diary, 113
 — wages, 117
 Oil purchases, 89
 Old material, 11, 40
 Omissions, 18
 Orders, 133
 — book, 210, 266
 — digest book, 109, 134
 Oregon pine, 65
 Overhead charges, 3, 117, 221
 Overstocking, 116, 127

PACKAGES, 194
 Paint covering capacity, 290
 Paint brushes, 89, 117
 Paint, etc., 132
 Painter, 88, 141
 — memoranda, 295
 — plant, 290
 Pantiles, 283
 Paperhanger, 94, 141
 — memoranda, 292
 — plant, 293
 Parquet, 61, 144
 Partitions, 55
 Party walls, 22
 Pass book, 120
 Patent glazing, 93, 141
 Pavement lights, 53, 142
 Paving, 52, 142
 Payment of accounts, 163
 — — certificates, 96, 157
 — — subcontractors, 165
 — — wages, 199
 Pegging out site, 24
 Petrograd standard, 281
 Petty cash book, 213, 216, 257
 Pipes (rain water), 77
 — gas and electric, 83
 Pitch pine, 130
 Plans, 9
 Plant, 10, 206
 — book, 210, 271
 — depreciation, etc., 183, 201
 — disposal, 97

Plant, insurance, 171
 — lists, 293
 — ownership, 21
 — removal, 97
 — weight, 193
 Plasterers, 81
 — memoranda, 287
 — plant, 294
 Plate glass fixing, 92
 — — insurance, 92, 176
 — walling, 137
 Plumber, 55, 83, 142
 — memoranda, 288
 — plant, 295
 Pointing, 52, 142
 Poles (telegraph), removal, 40
 Polishing (French), 59, 142
 Portland stone, 280
 Précis of letters, 108
 Preliminaries, building operations, 35
 Preservatives for wood, 88, 290
 Price books and lists, 124
 Priced quantities, 17
 Pricing stocks, 201
 Prime cost, 3, 11, 223
 — — amounts, 11
 — — book, 217, 224
 — — items, 134
 — — ledger, 221
 Priming joinery, 56
 — covering capacity, 290
 Production, 41
 Profits anticipated, 163
 Profit and loss account, 182
 Property risks, 9
 Protection clause, 13
 Provisional items, 11, 146
 Pulling down, 9, 33, 40
 Purchase book, 210, 242
 Purchasing, 127
 Putty (plasterers'), 82
 — (glaziers'), covering capacity, 291

QUANTITIES, 9, 17
 Quantities, deposit, 25
 Quarrying, 9, 175
 Quebec yellow pine, 64
 Quotations, 111

RAILINGS and gates, 79, 142
 Railway charges, 185
 — claims, 190
 — classes, 185
 — classification book, 186
 — facilities, 10
 — invoices, 185
 — ledger accounts, 36
 — rates, 189

Railway rebates, 188
 Rainwater goods, 77, 131
 Rangoon teak, 64
 Rates and taxes, 118, 179
 Rations (horse), 153
 Real accounts, 225
 Receipts, 105, 111
 Red lead, 291
 — oak, 64
 Reduced brickwork, 279
 Redwood, 64
 Refuse conveyancers, 61
 Reinforced concrete floors, 45, 137
 Removal of plant, 97
 — — telegraph poles, 40
 — — temporary meters, 97
 Rendering statements, 157
 Rent, rates, and taxes, 118, 179
 Repairs allowance, Income Tax, 180
 — after completion, 96
 Replacement of breakages, 197
 Retention amount, 20
 — period, 162
 Returns, 194, 196
 — book, 210, 274
 Ridge crests, 73, 143
 Risers, 281
 Risks adjoining property, 9
 Road approach, 9
 Roof ventilators, 143
 — tiler, 71
 — — memoranda, 283
 Roofing felt, 281
 Royalty, 10
 R.S. joists, 76, 285
 Rubble work, 51

SALVAGE, 40, 150
 Sand, 279
 Sanitary supplies, 205
 Sashes and frames, 56
 Sawdust for floors, 56, 81
 Scaffolding (dropping same), 53
 Screws, 131
 Sculpture, 53, 136
 Seasoning timber, 59
 Selection of timber, 27
 — — gas fittings, etc., 84
 Settlement of accounts, 97
 Shoddies, 280
 Shoddy walling, 51
 Shortages and breakages, 134, 197
 — in quantities, 18
 Shortcomings of subcontractors, 37,
 147
 Short policies, 170
 Siberian oak, 64
 Signing contract, 19

Sirapite, 287
 Size, 291
 Skimming, 81, 287
 Slack periods, 7
 Slate nails, 282
 Slater, 71
 — memoranda, 282
 — plant, 294
 Slatework, 143
 Sleepers, 9
 Sliding partitions, 137
 Smith, 76
 — memoranda, 285
 — plant, 295
 Soderham deals, 64
 Soil, 9
 Spalls, 279
 Special bricks, 48
 Specification, 9, 18
 — book, 210, 275
 Spruce deals, 64
 Squaring dimensions, 251
 Stain covering capacity, 290
 Stamp book, 210, 276
 Standard (Petrograd), 281
 — price lists, 125
 Stanchions, 38, 76
 Statements, 70, 105, 157
 — book, 210, 275
 Steel sashes, 140
 Steelwork, 76, 285
 Stocking glass, 91
 Stock list, 129
 Stocktaking, 200
 Stone ballast, 279
 — crusher renewals, 156
 — dressed, 50, 136, 280
 — steps, 143
 Stoppages, 25
 Stove tubing, 140
 Strutting and planking, 42
 Subcontractors, 37 52, 147
 — failings, 37, 147
 Sub-letting, 12, 21, 36
 — glazing, 91
 — plastering, 81
 — slating, 71
 Subsidiary books, 210
 Suction gas, 154
 Sundry items at completion, 97
 Sureties, 18
 Surplus excavation, 10
 Surveyor's charges, 176
 Swedish timber, 64

TALLY Book, joiner's, 251
 Tar covering capacity, 290, 291
 Taxes, 118, 179

Teak, 64
 Telephone charges, 117
 — and telegraph wires, 40
 Templates for leadlights, 51, 93
 Temporary water service, 83
 — meter removals, 97
 Tender memorandum book, 8
 Terra-cotta, 48, 143
 Terrazzo, 52, 141
 Testing drains, 46
 — engines, 35
 — weight of cement, 44
 Third party insurance, 176
 Tiler, 71
 — memoranda, 283
 — plant, 294
 Tiling (asbestos), 73, 282
 — sub-letting, 71, 144
 — wall, 74, 144
 Timber, 55, 63, 116, 143
 — book, 210, 251
 — measurement, 281
 — seasoning, 59
 — waste, 253
 Time sheets, 235
 Tin, weight of, 290
 Town gas, 154
 Trade discounts, 134, 164, 239
 — expenses, 116, 221
 — memoranda, 279
 — prime cost book, 224
 — terms, 21
 Tradesmen's accounts, 164
 Trading accounts, 182
 Transfer book, 210, 259
 Transport, 151, 210, 255
 Treads and risers, 281
 Trespassers, 36
 Tubes, electric, 83
 — galvanised vent, 138
 — stove, 140
 Turnover (bank), 120
 Turpentine, 291

VARIATIONS, 163
 Varnish, 290, 291
 Vehicles, 151

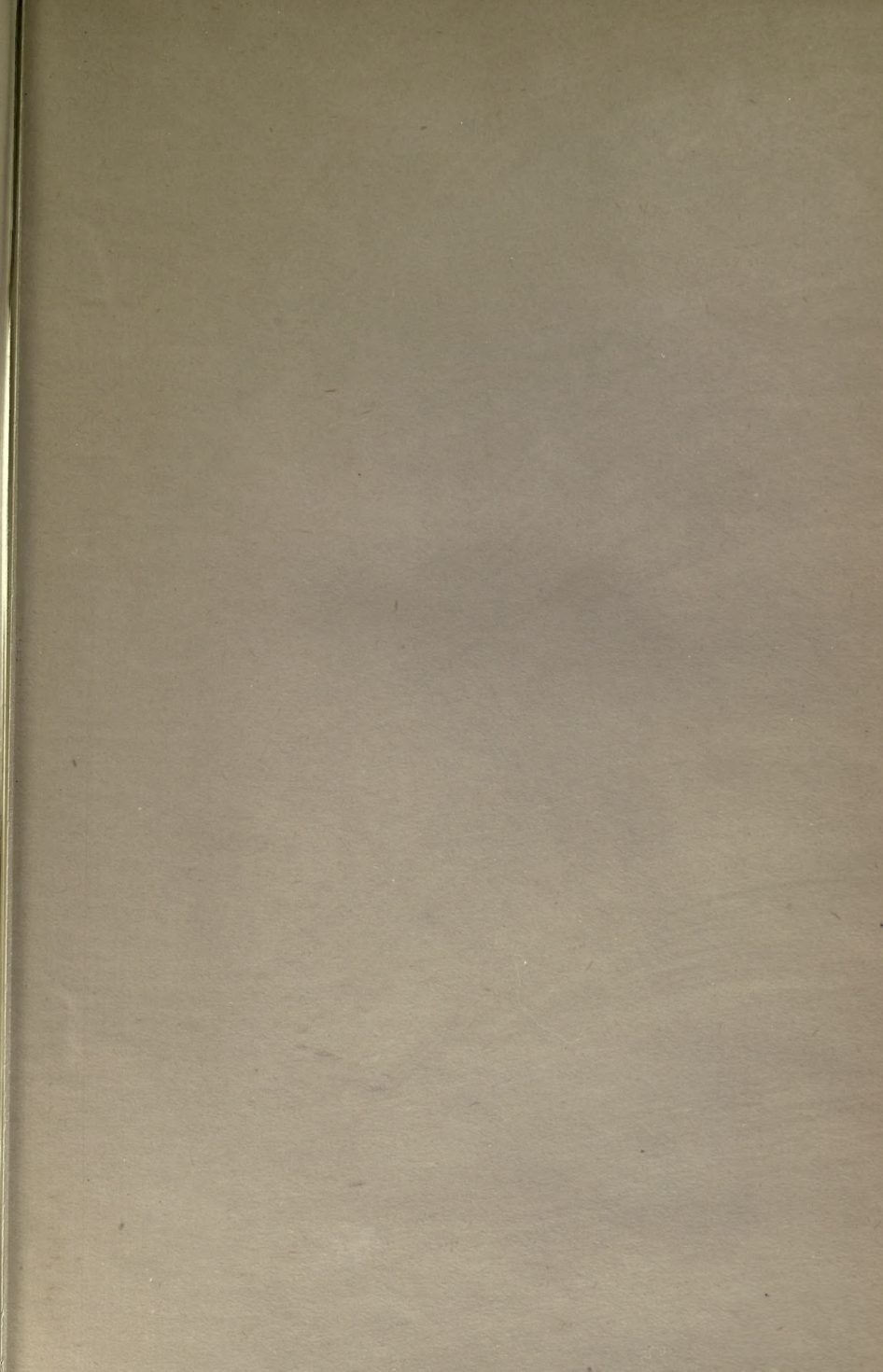
WAGES, 4, 16
 — book, 210, 230
 — office, 117
 — payment, 199
 Wainscot oak, 64
 Wall tiler, 74
 Walling, 89, 140
 Walling stones, 144, 280
 Wash floors, 95, 144
 Washable paints, 291

Waste, 116, 257
 Water service, 11, 38, 83, 178, 205
 — meter removals, 97
 — paints, 291
 Wear and tear, 183
 Weighing cement, 44
 Weight of metals, 290
 — — plant, 193
 — — timber, 281
 — — zinc, 290
 White lead, 89
 — lime, 82, 144
 Whitewood (canary), 65
 Whiting, 290
 Window cleaning, 95, 144
 — — plant, 295
 Wire window guards, 93, 138
 Wires, electric, 81, 83

Wood block flooring, 61, 144
 Wood preservatives, 88, 290
 — working machinery, 155
 Worked stone, 50, 135
 Working details, 25
 Workmen's compensation insurance,
 172
 Wrot boards, 55

YANG teak, 64
 Yard stock, 106
 Yellow deals, 64
 — pine, 64
 Yorkshire stone, 280

ZINC nails, 282
 Zinc, weight of, 289
 Zinc worker, 289



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